MODEL AIRPLANE NEWS

12th Year of Publication

FEBRUARY, 1941
20c

Republic "Guardsman"
Fighter-Bomber

DOPES SELL IN HANDY CLEAR-GLASS BOTTLES FOR

¼ PINT	20¢
½ PINT	35¢
1 PINT	60¢
1 QUART	$1.00
1 GALLON	$3.00

(ALSO IN 4oz & 10oz BOTTLES)

FOR HIGHEST QUALITY and EXTRA QUANTITY

Insist on

DOPES and CEMENTS by TESTOR

PRECISION PROCESSED

All Testor products are "Precision Processed" . . . carefully compounded to Testor's own standardized scientific formulas under uniform laboratory control.

● Testor's Dopes (clear dope, colored dopes in a full range of colors; also Banana Liquid and Thinner) are supplied in big, handy, wide-mouthed, clear-glass bottles. Testor's Dopes give solid coverage, brilliant gloss, uniformly true coloring, no blushing, firm but flexible "draw", low-drag minimum skin friction, and are extremely light in weight. Testor's Model Airplane Cements are quick drying, tough and tenacious, crystal clear, light in weight. In addition, there's Testor's Tissue Cement and Testor's Bamboo Cement . . . now, for the first time, put up in handy, long-nozzle tubes for quick, easy spreading in narrow ribbons! Ask for Testor's *by name*. At your dealer's . . .

TESTOR'S CEMENTS ARE TOUGH AND TENACIOUS

This big double-size tube of Testor's Model Airplane Cement (shown actual size) holds 1 full ounce . . . sells for 5c. Testor's 10c tube of Model Airplane Cement holds 2 full ounces . . . contains heavier-bodied Formula M-77 developed especially for gas models.

TESTOR CEMENT CO., "The House of Adhesives", ROCKFORD, ILL.

World's Largest Manufacturers of Model Airplane Chemicals

THERE CAN'T BE A WEAKNESS AT 80 M.P.H.

SUPER-CYCLONE

PERFORMANCE IS THE PROOF

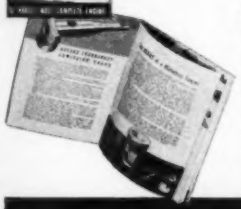
When race cars roar to new world's records, turning nearly 15,000 R.P.M., not one tiny part of the engine can fall short of perfection. No greater test of stamina and craftsmanship can be devised, and no engine has passed this test as completely as SUPER-CYCLONE. Topping an array of speed runs too numerous to detail is the new world's 1/4 Mile Record of 80.86 M.P.H. set by BERT (Speed) HANNIGAN with his SUPER-CYCLONE in an A.M.R.C.A. sanctioned race at the Holly Bowl in Van Nuys, Calif. He is also holder of the Official World's Record for the 1/2 mile at 74.56 M.P.H. SUPER-CYCLONE gives top performance and holds up at all speeds and distances. At 15,000 R.P.M. there can be no engine weakness. SUPER-CYCLONE has proved it has none by passing these torturing tests. It really is a SUPER engine!

CONSISTENT PERFORMANCE

What does race car performance mean to the airplane builder? SUPER-CYCLONE Airplane Engines are basically of the same construction as the Race Car Engines built to stand the gaff at 15,000 R.P.M. and a normal airplane speed of 7,000 R.P.M. is easy for them. SUPER-CYCLONE victories in meets from coast to coast tell the story. ASK ANY 'CYCLONE OWNER.

We introduced the hollow rotary crankshaft principle and dual ignition system to the miniature field. The ignition system is an adaptation of the principle used in the finest automobiles. It has always been one of our precision shop practices to manufacture pistons and cylinders as individually lapped units. Our aluminum die castings are the finest the world produces.

FREE!
A NEW BOOK FOR YOU

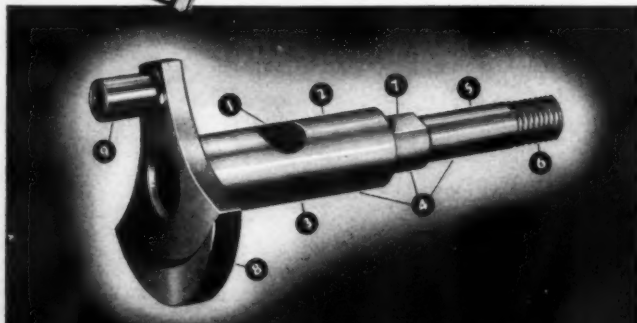


No advertisement can possibly describe the features, specifications and construction of SUPER-CYCLONE, the world's most complete engine. In fact, it has taken us 24 pages in our new, profusely illustrated, two-color catalog. Check the order blank and mail today for your copy.

"G" SERIES
AIRPLANE ENGINE
DUAL IGNITION
$15

50% DISCOUNT FOR YOU!

In buying SUPER-CYCLONE direct from the manufacturer, you save 50% (the usual distributor's commission) and obtain the world's most complete engine for 1/2 price! Thus you get a $26.00 engine for only $13.00 or or $32.00 engine for $16.00.



SUPER-CYCLONE'S PARADE OF FEATURES

The design and craftsmanship of an engine should be apparent in each of its component parts. This month, let's take a look at a real crankshaft.

1. Rotary valve integral with shaft. We introduced the rotary crankshaft admission valve to the miniature engine world.
2. Machined all over from solid bar steel.
3. Made from a new type of perfected steel, the name of which is our trade secret, but which compares with S.A.E. 3140.
4. Ground to SUPER-CYCLONE requirements by one of the finest and best equipped grinding specialist shops in the country. Ground accurately between centers to a tolerance of .0001 inch for absolute concentricity.
5. No bend from slightly abnormal landing.
6. Fine steel prevents threads from popping off if prop nut is tightened too much.
7. Straddle milled flats for cam shoulder.
8. Counterweight integral with shaft.
9. Crank pin integral with shaft.

AIRCRAFT INDUSTRIES CORP.,

GRAND CENTRAL AIR TERMINAL, GLENDALE (Los Angeles) CALIFORNIA
HOME OF THE FAMOUS CURTISS-WRIGHT TECHNICAL INSTITUTE

Please send me the items checked.
I enclose POST OFFICE MONEY ORDER:

SUPER-CYCLONE "G" SERIES

The Airplane Engine, Complete and Fully Assembled

☐ Upright Single Ignition **$13.00** ☐ Upright Dual Ignition **$15.00**
☐ Inverted Single Ignition **$13.50** ☐ Inverted Dual Ignition **$15.50**

BABY CYCLONE ☐ America's most popular engine for sport flying . . **$9.00**

PROPELLERS — Finest Quality Obtainable (☐ 14", ☐ 13", ☐ 12") 75c
☐ Steel Mounting Brackets . . . 50c

SUPER-CYCLONE "G-R" SERIES

The Race Car Engine, Complete and Fully Assembled

☐ Single Ignition . . . . **$14.00** ☐ Dual Ignition **$16.00**

FREE ☐ PLEASE SEND THE NEW SUPER-CYCLONE CATALOG
ALL POSTAGE PREPAID IN U.S.A.

SHIP TO _____ AGE____

ADDRESS _____

MA-2

PROP WASH

THE UNITED STATES air defense program roars into action. On and behind the production lines disgorging an endless stream of aircraft, work many model builders, past and present.

IN DRAFTING ROOMS, poring over square miles of blueprints, ceaselessly labor engineers who learned much about their now all-important profession in the practical aeronautics school of gas and rubber powered models.

AND THOSE thundering 1600 hp. giants being block-tested at a certain plant have much increased efficiency and reliability because a bright young man got an idea while experimenting with his model's .06 hp. power plant.

A NAVY PILOT hovers two thousand feet above a vast expanse of ocean awaiting his signal to come aboard the tiny ship beneath—the aircraft carrier Lexington. This impatient lad began his career as a sailor of the sea and sky by constructing a prize-winning scale model of the famous Curtiss Sparrowhawk F92C-1, one of the five heavier-than-air craft carried by the ill-fated dirigible Akron.

A HUGE bomber rumbles across the sky with a ponderous load of steel-encased T.N.T. The army entrusts this expensive machine and its highly trained, precious personnel to a man who once mastered the theory of flight to assure himself that any model contest he won would be won by skill, not chance.

A SWIFT, angular formation of saucy pursuits "peel off" one by one into breath-taking dives on an imaginary enemy far below, piloted by physically perfect youths many of whom had previous involuntary training while chasing zealous models across the American landscape.

YOUNG MEN ALL, these, the pioneers of model airplane building; a game they loved and developed by their ingenuity and indefatigable energy.

FACED WITH a threatened war on two far-flung fronts—desperately short of air power—Uncle Sam should be eternally grateful in this emergency that model builders grow up.

The Editor

12TH YEAR OF PUBLICATION

MODEL AIRPLANE NEWS

FEBRUARY 1941 VOL. XXIV, No. 2

CONTENTS

Edited by
Charles Hampson Grant

•

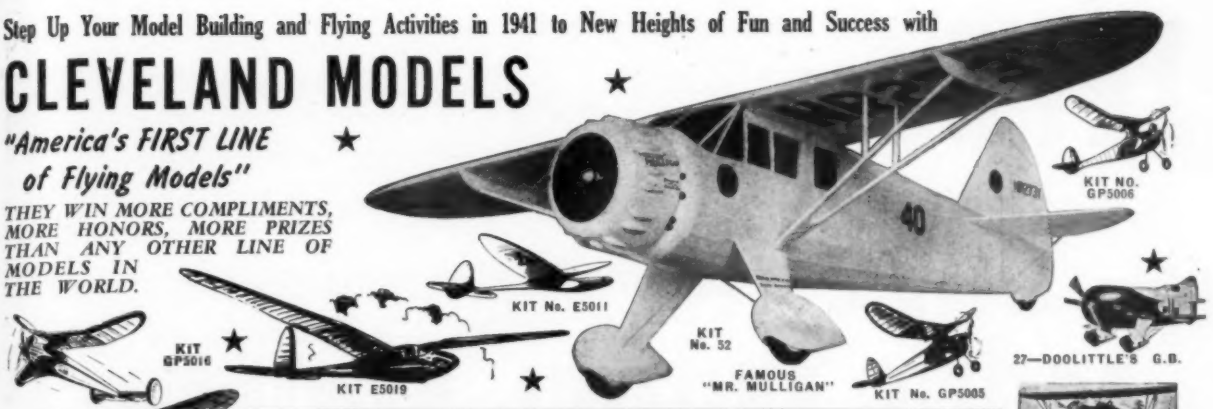
Published monthly by Jay Publishing Corp., Mt. Morris, Illinois. Editorial and advertising offices: 551 Fifth Ave., New York, N.Y. George C. Johnson, President; Jay P. Cleveland, Advertising Manager. Entered as second class matter Dec. 6, 1934 at the post office at Mt. Morris, Ill., under the act of March 3, 1879. Additional entry at New York, N.Y. Price 20c per copy. Subscriptions $2 per year in the United States and possessions; also Canada, Cuba, Mexico, Panama and South America. All other countries $2.50 per year.

Step Up Your Model Building and Flying Activities in 1941 to New Heights of Fun and Success with

CLEVELAND MODELS

"America's FIRST LINE of Flying Models"

THEY WIN MORE COMPLIMENTS, MORE HONORS, MORE PRIZES THAN ANY OTHER LINE OF MODELS IN THE WORLD.



★ SF KITS ★

Scale Flying SF Model Kits are, as the name implies, flying, authentic ¾" scale models of famous ships. All are now available in C-D COMPLETE (WET) KITS. They contain all parts including cements and dopes necessary in building these world famous model airplanes.

★ DWARF KITS ★

Dwarf kits are for authentic ½" scale models identical to the famed SF line except they contain everything necessary to complete building but colors. While we still honestly advertise these as dry kits they contain a tube of cement.

★ REP KITS ★

Cleveland "REP" Kits are all 30" Wing Span except the REP 5001 which is 27". Kits contain full sized detailed mechanical drawing, all wood printed out, finished scale wood wheels, turned cowl or drilled nose, finished balsa prop, strip Balsa cut to size, covering tissue, printed insignia and wing lettering cement, etc.

Kit No.		SF Wet Kits	Dwarf Dry Kits	EASY REP. Kits
1	Great Lakes Sport Trainer	$1.50	$.50	
8	Army Boeing P12-E	1.50	.60	
12	Bishop's Nieuport		.50	
13	Spad 13	1.50	.50	
14	Fokker Triplane		.50	
15	Fokker D-7 Fighter	1.95	.60	$.25
19	Supermarine S6-B	1.75	.65	
20	Hawker Fury Fighter		.70	
21	Hawk P6-E Fighter	2.25	.85	.25
27	Doolittle's Gee-Bee	1.50	.50	
28	Monocoupe Sportplane		.50	
29	Boeing F4B-3 Fighter	1.50	.60	
35	Boeing 247 Transport		1.95*	
42	Howard "Ike"	.95	.25	
45	Martin Bomber		1.95*	
48	'34 Turner's W. Wm.	1.75	.50	
49	Curtiss F11C-2	2.50	.85	
51	D. H. Comet Racer		.95	
52	"Mr. Mulligan"	1.75	.50	.25
53	Grumman F2F-1 Fighter			$.25
54	Hughes Racer			.50
55	Douglas Transport		$2.50*	
57	Old Gr. Lakes Trainer 2TI-E			.25
58	Ryan ST			.25
59	Hawker Low Wing Fighter			.25
60	Boeing P26-A	$2.25	.85	
61	Seversky Fighter	2.25	.85	
62	Custom Waco C6		.85	
63	'36 Caudron Racer	1.50	.50	
64	Beechcraft C-17-B		.85	
65	Lockheed Electra		1.95*	
66	Stinson Reliant			.25
67	Fairey Battle			.25
70	Al. Williams Gulfhawk			.50
71	'37 Folkert Racer	1.50	.50	
72	'38-'39 Turner-Laird	1.75	.50	
5001	Cleveland Amphibian			.25

*ALL KITS STARRED IN ABOVE TWO COLUMNS ARE COMPLETELY "WET" EVEN THO STILL IN THE DWARF LINE

CLEVELAND'S FAMOUS GAS MODELS

GP66	82" STINSON RELIANT (Scale)	$10.95
GP69	64" REARWIN SPEEDSTER (Scale)	7.50
GP5004	50" CLOUDSTER Class "B"	2.50
GP5005	48" CHAMPION Class "B"	2.95
GP5006	46" PLAYBOY JR. Class "B"	2.50
GP5007	42" FLEETSTER Class "B"	2.50
GP5008	33" BABY PLAYBOY Class "A"	1.00
GP5016	33" ITSY BITSY Class "A"	1.00
GP5017	80" PLAYBOY SR. Class "C"	3.95
GP5020	48" VIKING Class "A" or "B"	1.50

CLEVELAND ENDURANCE, ETC.

E5009	DARTS Class "A" Indoor	25c
E5010	18" ARROW Class "B" Indoor	25c
E5011	20" JAVELIN Class "B" Outdoor	25c
E5014	36" THERMALIER Class "C" Stick	50c
E5015	45" WAKEFIELD "GULL"	$1.00
E5018	48" EAGLET Soaring Glider (Baby Bowlus Type)	50c
E5019	84" CONDOR Soaring Glider	$1.00

CLEVELAND 25c SUPER VALUES

"NATURE" SERIES—All like the real thing—23" wingspan. Dragonfly N1, Swallowtail Butterfly N2, Bluejay N3, Vampire Bat N4, Barn Swallow N5, Flying Fish N6.

"MILE FLIER" TRIBUTE SERIES—Class "C" all 32" span or over—Cabin C1, Stick C2, Low Wing C3, Gas Type C4, B.O.W. Stick Amphibian C5, Glider C6. Each worth 2-8 times its price—get each only 25c. (No order for less than two of 25c numbers.)

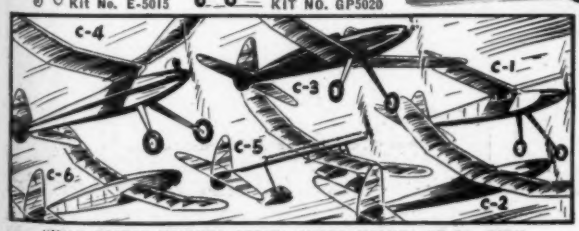
ORDERING INSTRUCTIONS Send check or money order—cash at your own risk. Include 15c for packing charge and postage under $1.00. Shipments outside U. S. add 10%. Remittances must be equivalent to U. S. Currency whether in Drafts, Money Orders or Cash. For P.P. Special Delivery in U. S.—Add 25c. "Same Day Service." DEALERS! Write today for information.

No. 32 Airplane CATALOG NOW ONLY 5c

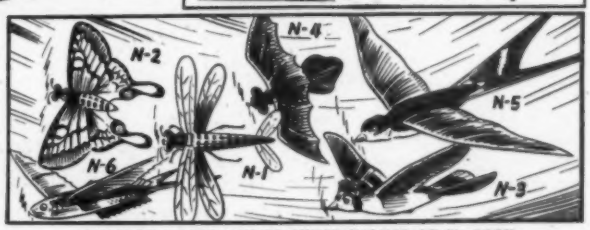
CLEVELAND

MODEL & SUPPLY COMPANY, INC.

4508A20 Lorain Ave. ★ *"Quality Models for the World Since 1919"* ★ Cleveland, Ohio, U.S.A.



"MILE FLIER" TRIBUTE SERIES SUPER VALUES AT 25c EACH



"NATURE'S OWN" SERIES SUPER VALUES AT 25c EACH

LET'S HAVE MORE MODEL AIRPORTS

The model flying field leased by the Craftsmen Club of Baltimore, Md. A model rises from the take-off site cleared of stubble. (Kulick)

By ALBERT LEWIS

WHAT this country needs is more model airports.

Once upon a time it was easy to fly models—you just went out into the street or park, and if your paper-covered R.O.G. flew 3 seconds or 30 feet, you were an accomplished aeromodeler.

All that started to change even before the advent of gas models, but with the appearance of internal combustion engine-powered craft, it became necessary to establish certain minimums for model flying sites—restrictions designed to benefit the modeler as well as protect the citizen.

All models should be grounded when full-scale aircraft appear on the horizon. Here a modeler waits while the blimp "Enterprise" scoots by the model-flying field

According to the Academy of Model Aeronautics, the governing body for model aviation in America, a model airport is "a level field at least a quarter of a mile square and away from congested areas." Such a field, according to the A.M.A., should have no nearby high-tension lines, lakes, forests, greenhouses, or sections from which the public and a modeler in pursuit of his craft are barred.

The Academy further states (and most importantly) that models should not be flown on or near any airport, or whenever any airplanes are flying unless the full-scale operations are suspended through previous arrangements with the aviation people. In addition, particular attention must be given to spectator control and this factor should be given considera-

You can interest police and fire dept. in your activities. Here are the engine and operator the Berlin, N. J. Fire Dept. sends to local contests

Directional route signs are an important requisite for all meets. Here the Aero Craftsmen have plainly labeled the 20½-mile route from Baltimore to the "field." (Kulick)

A few of the 2000 autos attending a South Jersey contest. Careful plans must be made for handling cars and they should park far from flying area.

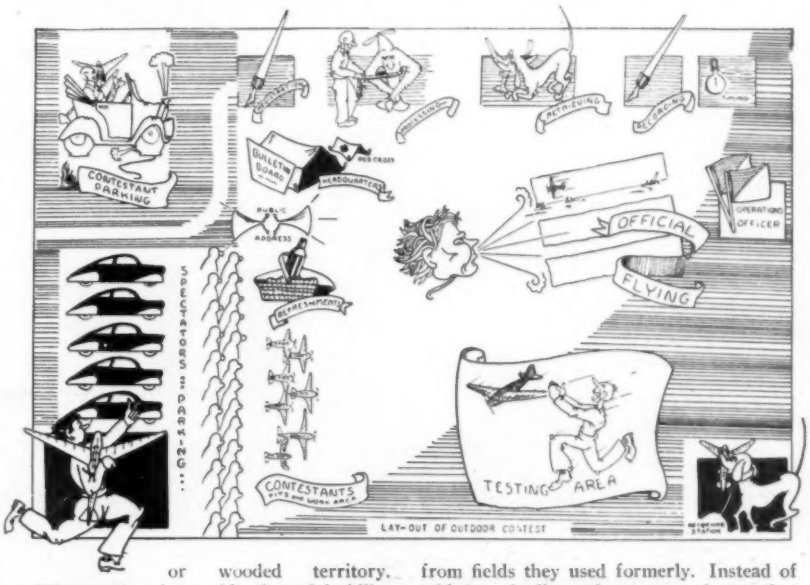
Timing Board used by Aero Craftsmen. Official explains how flight times of each contestant are recorded. (Kulick)

State Police are invaluable for controlling contest crowds

This sign tells the story of "What"—"Who"—"Where"—and "When" to those who are interested. (Kulick)

Earl Steinhauser "tells 'em" at the recent South Atlantic States meet

Increase Your Flying Hours —Reduce Personal Hazards and Contribute to Your Enjoyment and the Public's Air-mindedness by Establishing Your Own Model Airport



tion in the selection of a site.

At first glance the foregoing requirements may seem rather stiff and somewhat difficult to fulfill. However, look at it from the flyer's side. He spends many patient hours designing and building his craft; why should he be asked to fly from a postage-stamp-size field surrounded by houses or woods? The cycle of designing, building and flying a model is completed only when the final act, the flight of the model, is made under favorable conditions.

In other words, why so much patient labor in selecting a design and building a model if it's to be thrown away by flying the completed ship in one of these abominable spots so frequently selected for test flying?

It's far better to travel an extra five miles to a site removed from man-made and natural obstructions, than to sacrifice your ship on the altar of convenience—convenience arising from using a field in congested areas or wooded territory.

So, consider for a bit the advisability of developing a better model airport for your club's or your own individual flying. Here are a few hints to aid you in your quest for the perfect model flying port:

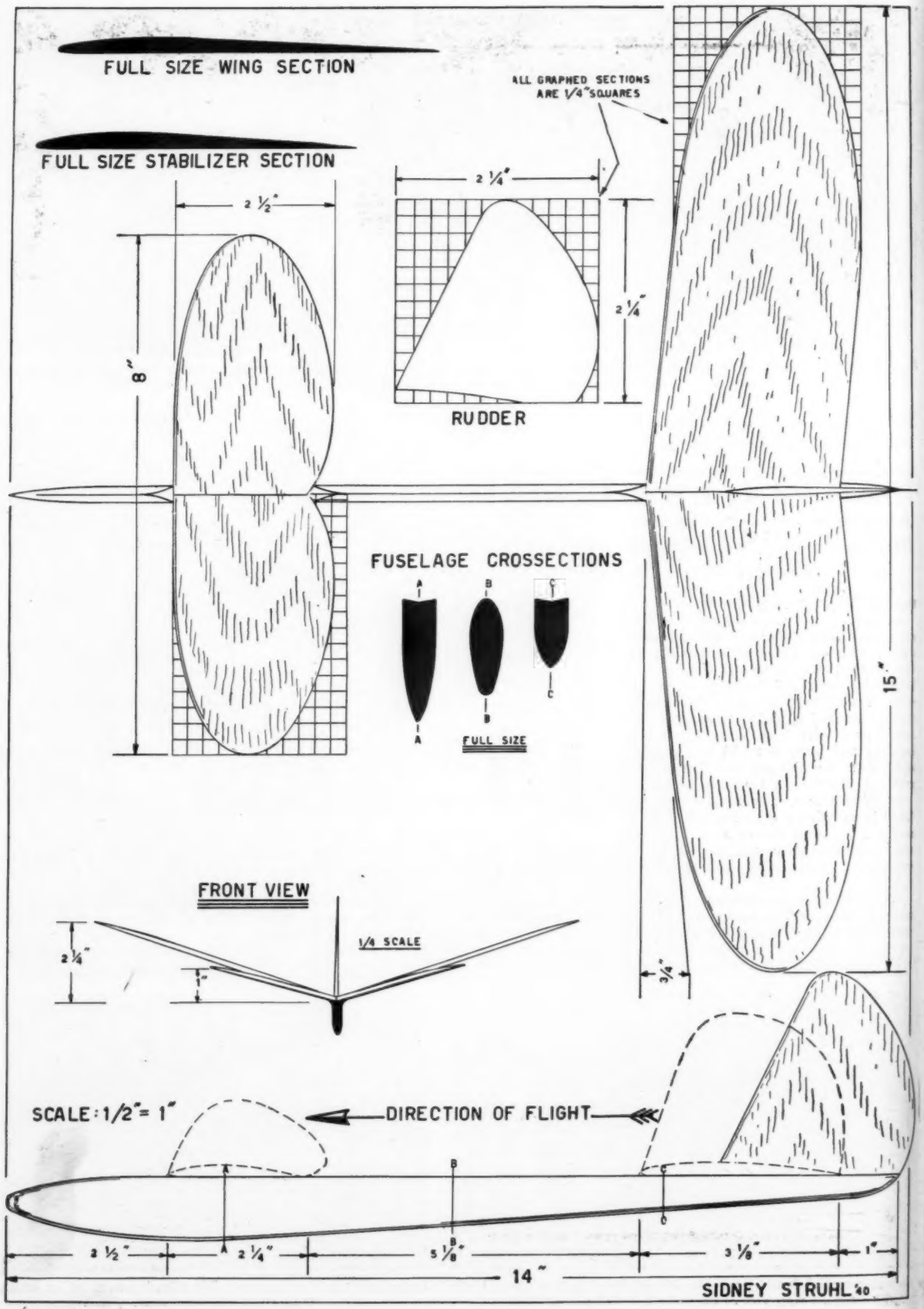
Since the national defense preparations have called upon aviation for unprecedented activity, many modelers have been barred from fields they used formerly. Instead of taking such disappointments to heart, that should provide clubs with the incentive to go out and hunt up better flying sites—better from the standpoint of the modeler and his craft, better for the protection of the public.

Every club member should join in the

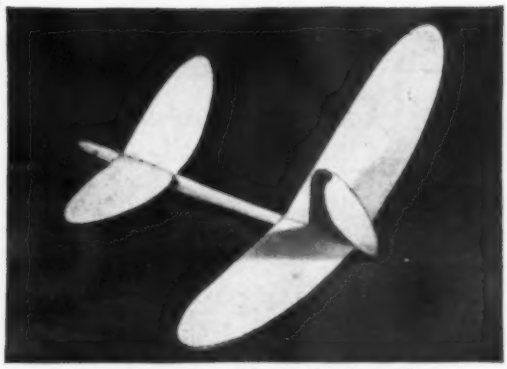
(Continued on page 50)

A well-managed South Jersey Gas Model Association contest in full swing showing part of crowd held back by rope barriers.

Fenced off "pits" and an accessible refreshment stand on which are announcer and address system. (Kulick)


FULL SIZE WING SECTION
FULL SIZE STABILIZER SECTION
ALL GRAPHED SECTIONS ARE 1/4" SQUARES
2 1/4"
2 1/4"
RUDDER
2 1/2"
8"
FUSELAGE CROSSECTIONS
A
B
C
FULL SIZE
15"
FRONT VIEW
2 1/4"
1/4 SCALE
3/4"
SCALE: 1/2" = 1"
DIRECTION OF FLIGHT
2 1/2"
2 1/4"
5 1/8"
3 1/8"
1"
14"
SIDNEY STRUHL '40

Two of these have been built: both have flown out of sight



In this pusher glider, both wings lift

Building The Pusher Glider

A Unique Plane That Has a Performance Far Superior to Normal Type Gliders—A Forerunner of Many Winners

BY SIDNEY STRUHL

PERHAPS you'll chuckle with amusement when you look at the photographs and the plans of the PUSHER. Let us predict, however, that you won't be chuckling but bemoaning the fact that you did not build one if you come up in competition against it in the hands of another contestant at your next contest.

Maybe this glider is lacking in conventionality, but it more then makes up for this deficiency when once it takes to the air. We are sure that you will be pleasantly surprised at the additional height that is gained over the usual type of glider. The glide on the Pusher is also much better then the glide on the common type glider.

The model pictured here is the second model of the Pusher built by the author. The first of the author's model was "nasty enough" to hook a terrific thermal on its FIRST flight. Needless to say, neither hide nor hair was ever seen of it again. And boy, was your author boiling! There he was with a complete manuscript and no model of which to take pictures. Well, your author got busy and made himself another Pusher and took some snapshots of it immediately. . . . And it's a good thing he did because when he took his second Pusher out to the park for a little flying, he lost that, out-of-sight too. This wasn't the first flight however. The time of this flight was eight minutes and twenty-four seconds before disappearing behind a thick cloud. It is not remarkable for a glider to fly-out-of-sight but when the same design persists on doing that kind of flying without being fully adjusted, well that IS something.

Another thing, whenever a gust of wind hits the Pusher it does not go into a spin like the usual designed glider will, but keeps on its same steady course.

This is one model that really fits the

(Continued on page 56)

Flying Men and Flying Models

BY KEN WILLARD

DOES model building help a fellow when he is learning to fly? Some say that the amount of help received through a knowledge of models is of very little importance. Unquestionably model builders have a definite advantage over those who have never had an interest in miniature airplanes. That was my opinion before making a thorough investigation of the question, and now I am more firmly convinced of the fact than ever before.

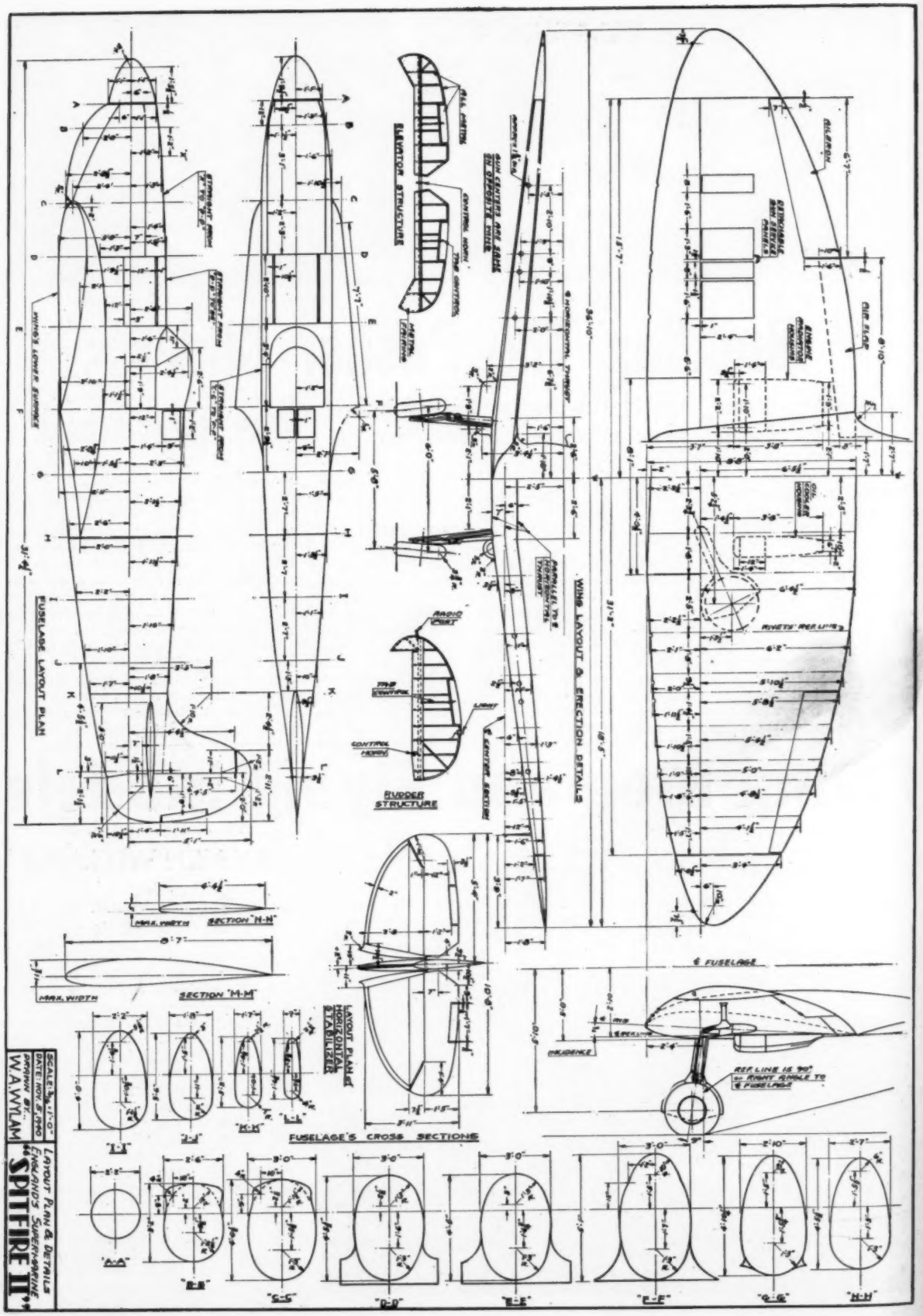
So, let's see some concrete examples:

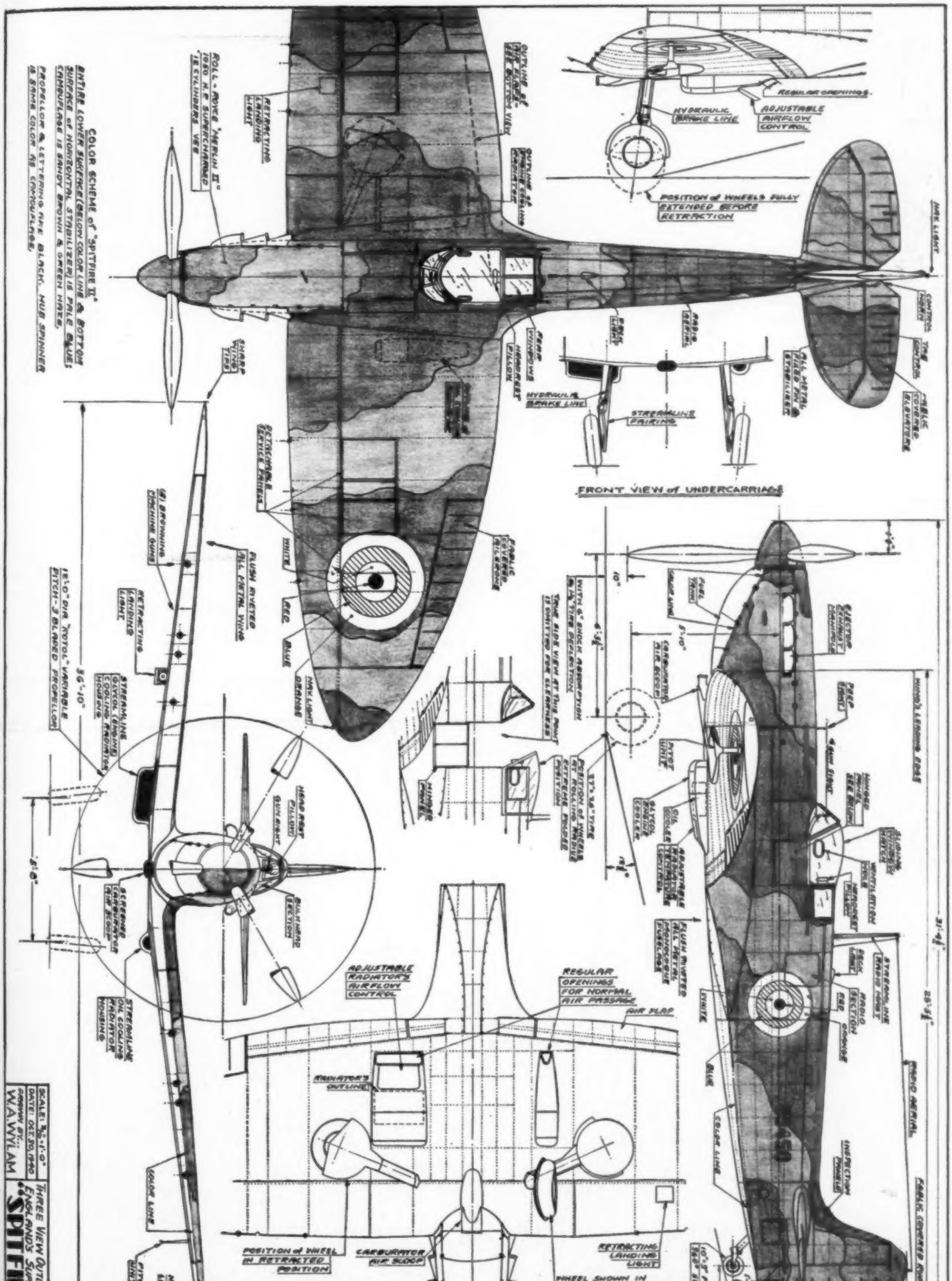
Here at Parks we are engaged in training cadets for the United States Army Air Corps. Seventeen other civilian schools scattered throughout the United States are giving similar training. When the graduates of these schools enter one of the basic schools (we only give the primary training) they are supposed to be familiar with all the flight maneuvers, including aerobatics, which a modern airplane is capable of performing. Furthermore, they have received instruction in several phases of the theory behind practical flight training, including engines, airplane structures, theory of flight, navigation and meteorology. The instruction is intense and the course is relatively hard; it takes a good man to complete the course, as is indicated by the percentage of failures. But a good man can complete the course and proceed to bigger things both in the way of airplanes and training.

Models are indispensable to the instructor for indicating certain flight maneuvers

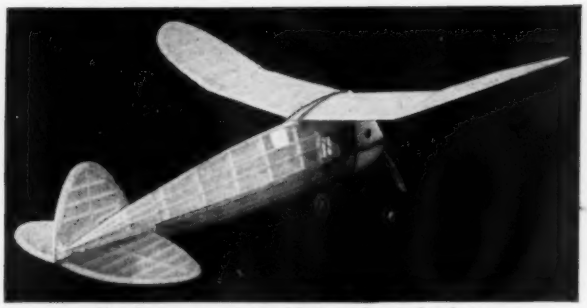
It is the responsibility of the Head of the Department of Meteorology to see that adequate training in the initial phases of weather problems is given to the cadets. As a United States citizen, afforded an

(Continued on page 38)

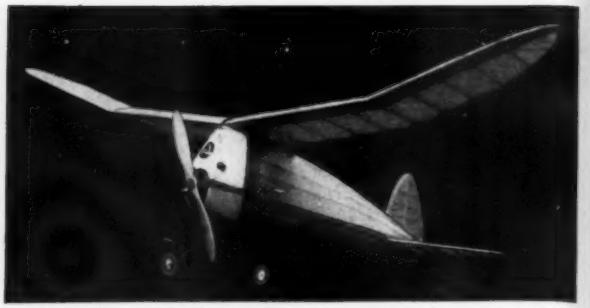

FUSELAGE LAYOUT PLAN
ELEVATOR STRUCTURE
RUDDER STRUCTURE
WING LAYOUT & ERECTION DETAILS
SECTION "M-M"
SECTION "N-N"
LAYOUT PLANE HORIZONTAL STABILIZER
FUSELAGE'S CROSS SECTIONS
"A-A"
"B-B"
"C-C"
"D-D"
"E-E"
"F-F"
"G-G"
"H-H"
"I-I"
"J-J"
"K-K"
"L-L"
REF LINE IS 90° TO RIGHT ANGLE TO ℄ FUSELAGE
℄ FUSELAGE
INCIDENCE
SCALE: 3/4"=1'-0"
DATE: NOV. 5, 1940
DRAWN BY W. A. WYLAM
LAYOUT PLAN & DETAILS
SUPERMARINE
"SPITFIRE II"



THREE VIEW OUTLINE & DETAILS
ENGLAND'S SUPERMARINE
"SPITFIRE II"
SCALE: 3/32"=1'-0"
DATE: OCT. 30, 1940
DRAWN BY: W.A.WYLAM
COLOR SCHEME of "SPITFIRE II"
ENTIRE LOWER SURFACE (BELOW COLOR LINE) & BOTTOM SURFACE of HORIZONTAL STABILIZER IS PALE BLUE; CAMOUFLAGE IS SANDY BROWN & GREEN KHAKI.
PROPELLOR & LETTERING ARE BLACK. HUB SPINNER IS SAME COLOR AS CAMOUFLAGE.
ROLL-ROYCE "MERLIN II" 1030 H.P. SUPERCHARGED 12 CYLINDERS VEE
REGULAR OPENINGS
HYDRAULIC BRAKE LINE
ADJUSTABLE AIRFLOW CONTROL
POSITION of WHEELS FULLY EXTENDED BEFORE RETRACTION
STREAMLINE FAIRING
FRONT VIEW of UNDERCARRIAGE
ADJUSTABLE RADIATOR'S AIRFLOW CONTROL
REGULAR OPENINGS FOR NORMAL AIR PASSAGE
AIR FLAP
RADIATOR'S OUTLINE
POSITION of WHEEL IN RETRACTED POSITION
CARBURATOR AIR SCOOP
RETRACTING LANDING LIGHT
WHEEL SHOWN IN EXTENDED POSITION
SPECIAL BOTTOM VIEW



Simple construction with "teardrop" fuselage



Clean and efficient, it gives "super" performance

HERE COMES THE "PACER"

By SAL TAIBI

THIS model is a sleek, fine-performing ship that is very easy to build, developed from a design which was first flown at the 1940 Nationals.

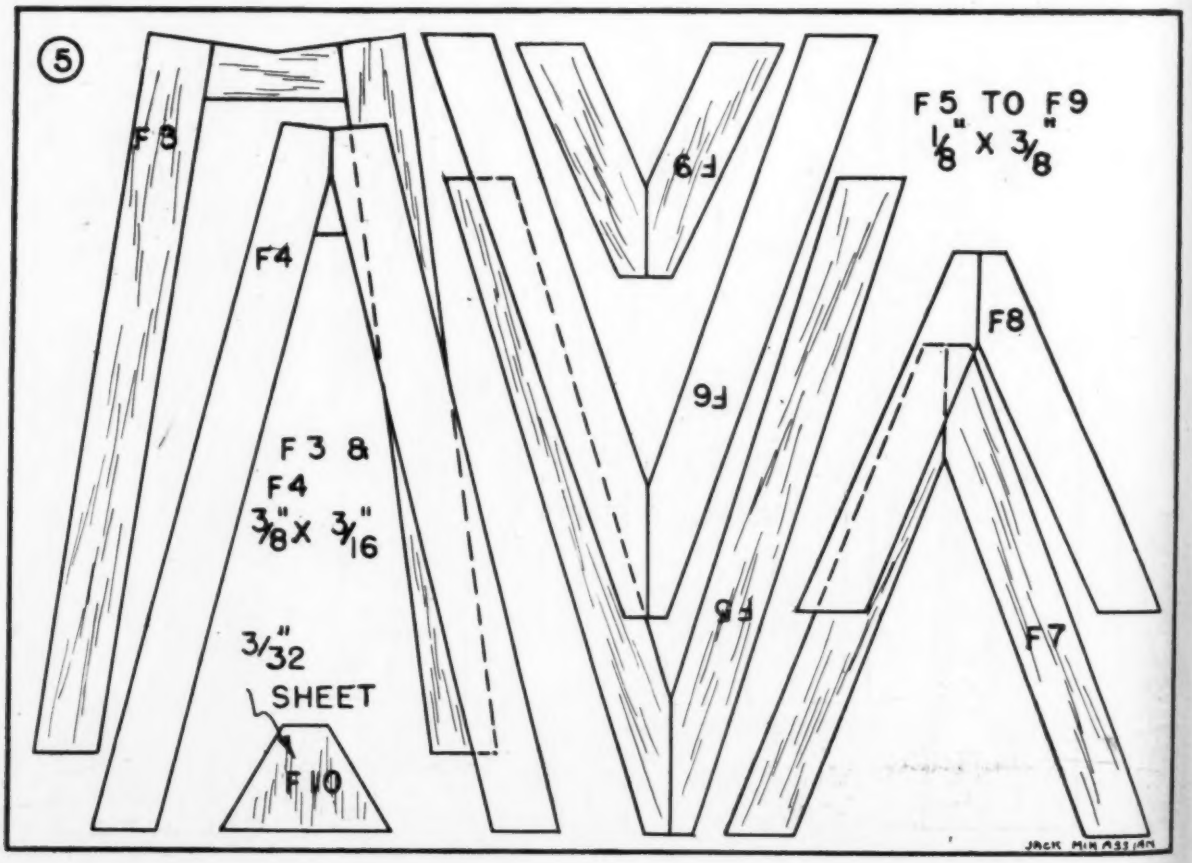
It is a most consistent flier as well as one which is capable of great duration. Up to the present time the best flight is 13 min. 20 sec., which was made at Poughkeepsie, N. Y. The plane was first flown at the Flying Dutchmen Contest at Valhalla, N. Y., where it was lost and not returned until the contest was over.

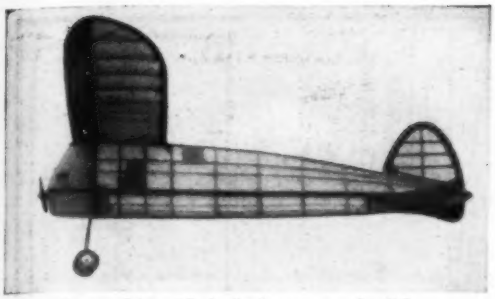
One day we took out the Pacer and after a few preliminary flights opened up the motor. The time of this flight was well over three minutes on a 20-second motor run. The next three flights were timed with a stop-watch; flying on a 20-second motor run the Pacer made, consecutively, 3' 22", 3' 25" and 4' 43" for an average time of 3' 50". All of these flights were made after 4:30 p.m.

It climbs in a tight right circle and when the motor cuts out the ship rolls out of the bank into a wide left circle. The design of the ship has been developed over a period of five months during which time it has been continually tested and improved.

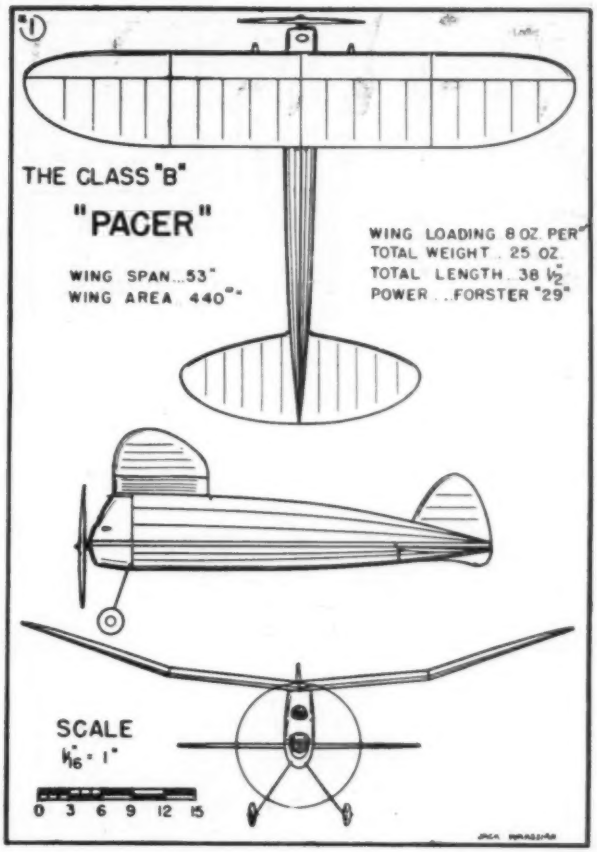
Building and Flying

We think it appropriate at this time to mention a few structural points. The simplicity and ease of construction will amaze you. The Pacer can be built in about thirty-five hours, for it is one of the easiest planes to build. There are no sides to build, thus eliminating the tiresome job of inserting uprights and diagonals and waiting for them to dry. The stabilizer and rudder are built flat. The wing is the only part of the ship that will require a little more than average time to build, as it is sheet covered and cap stripped, but the strength and efficiency more than compensates for the work.





Snapped in mid-air during a smooth glide



A Light High Performance Class "B" Gas Model—A Most Consistent Flier of Simple but Rugged Construction

Fuselage

Before attempting to build the Pacer, first scale the drawings to full size; this will clear up any seeming difficulties in construction. All bulkheads and formers are full size; this will make the scaling of the plans easier. Notice how the gumwood is spliced to the balsa crutch, making a good glue joint which will not come apart easily. Formers 1-4 are made of 3/17 x 3/8" medium balsa; formers 5-9 are made of 1/8 x 3/8" medium balsa; former No. 10 is made of 1/8" sheet balsa. Bottom bulkheads are cut from 3/32" sheet balsa.

The crutch is the first part built (fuselage detail 1). While this is drying make all the formers, 1-10 inclusive. While these are drying cut out the firewall and the bulkheads. The formers, firewall and bulkheads are then glued in place on the crutch. After this is dry glue the top longeron 1/4" square in place.

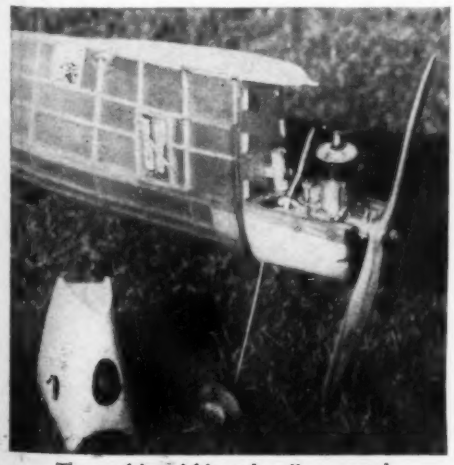
The stringers are then inserted in their proper positions. The top stringers are 1/8" square; the bottom stringers are 3/32 x 1/4". The fuselage wing-rest is traced with carbon paper, cut out and glued on top of formers 1-4 inclusive. Be sure to give the fuselage at least three coats of glue. The landing gear is bent to shape and glued to the firewall with a piece of 5/16 x 1/2" grooved basswood (see fuselage detail). Select a soft piece of balsa 3 x 2-1/2 x 4-1/2" for the bottom nose block; glue in place. Cut out the bottom of the cowl after it has dried.

Aluminum tubing 3/32 O.D. is inserted behind former 9, a piece of 1/8 x 1/4" balsa is glued to the rear bottom of former 9 to serve as a brace for the tubing at the bottom. The top longeron serves as the top brace as the aluminum tubing passes through it. Glue this thoroughly as this is the main front rudder post. A piece of aluminum 7/16 x 1-1/4" is glued to the fuselage at the extreme rear (see fuselage detail). Another piece of aluminum 1/2 x 1-3/4" is glued to the rudder. This is the rudder adjustment. Drill a 1/16" hole through both pieces of aluminum and the fuselage. A piece of 1/16" dowel is then inserted in the hole, to prevent the rudder from coming off while the ship is in flight.

The next step is the carving and shaping of the cowling. This is the beauty of the ship and also completes the almost-perfect streamlining. Select a medium piece of balsa 3 x 4 x 4-1/2" for the cowling. The block is fitted into the fuselage, glued lightly, and allowed to dry for about an hour. The outside form is then cut and sanded to shape. Remove the cowling and cut out the inside. Leave the cowling about one-quarter of an inch thick all around.

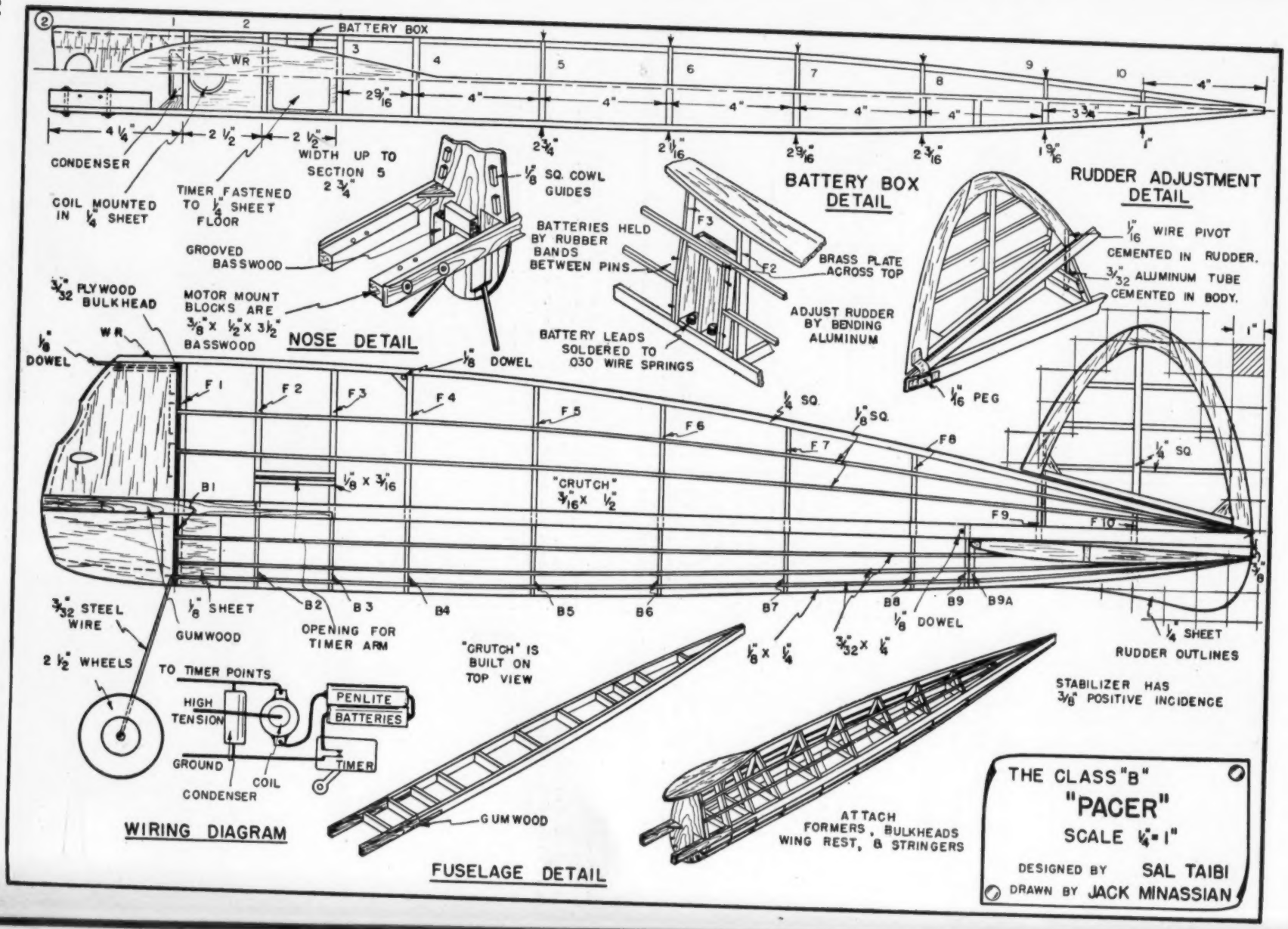
Motor mounts are then made of 3/8 x 1/2" basswood. Mount the motor in place. Slide the cowling onto the ship as far as

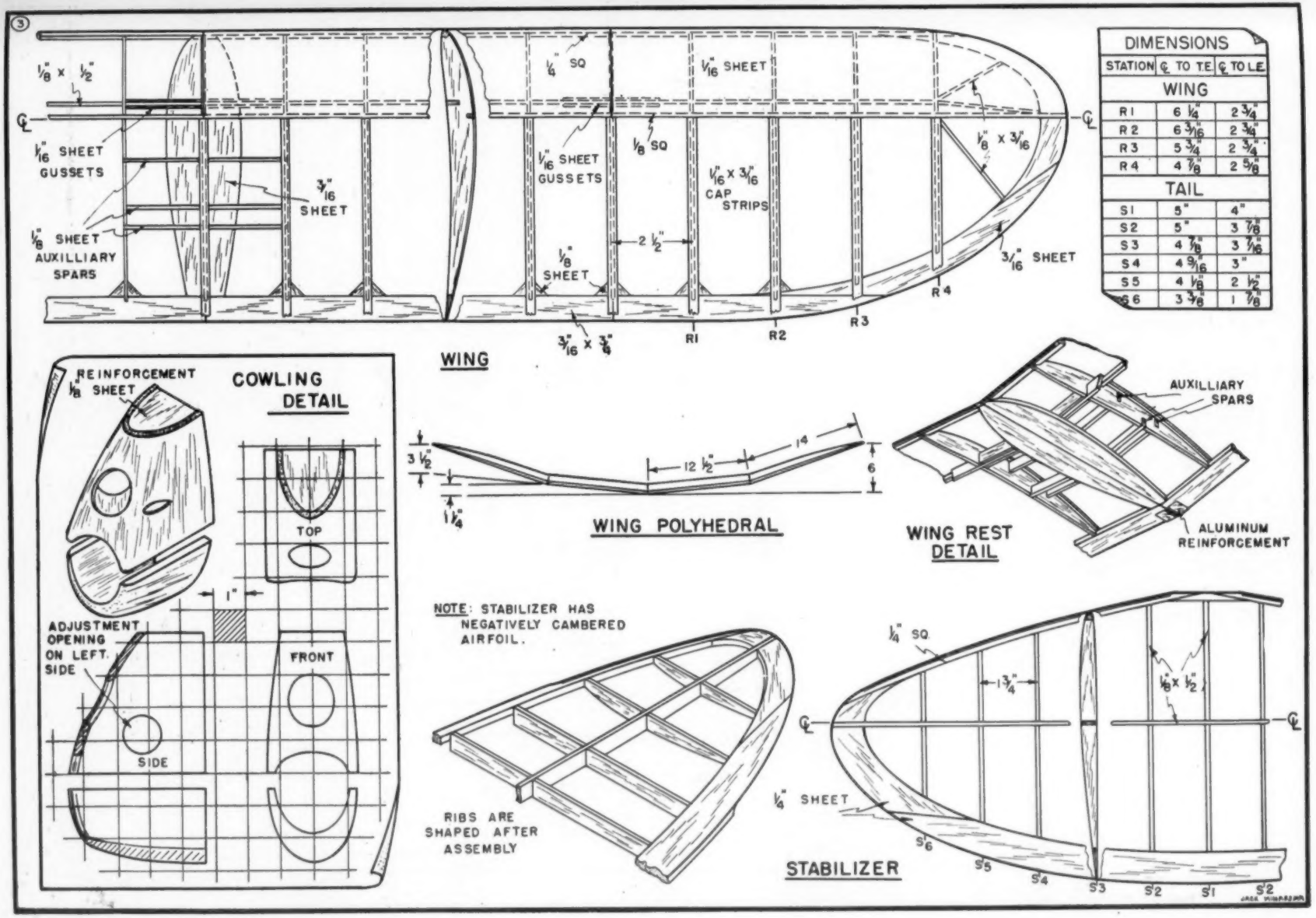
(Continued on page 52)

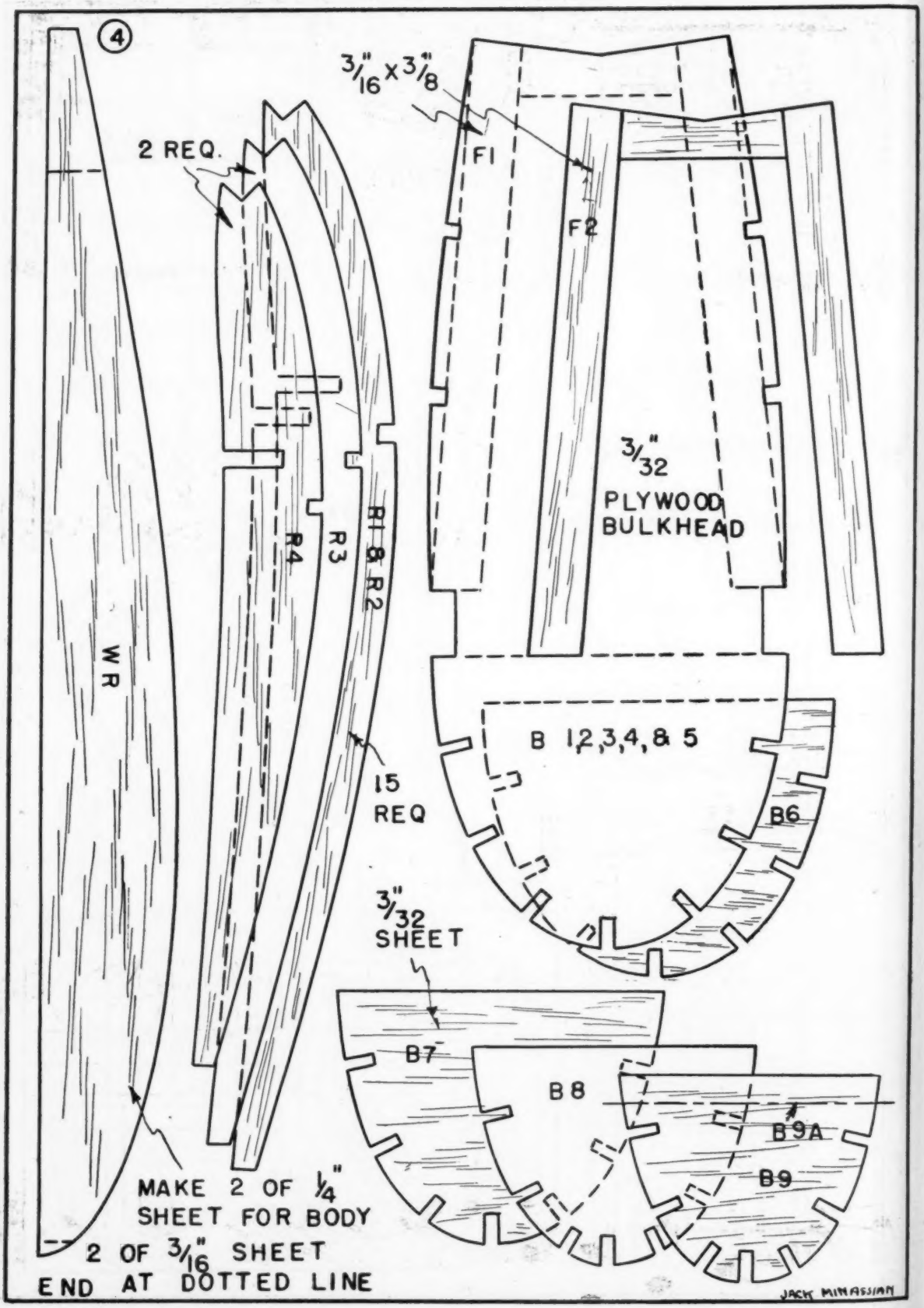


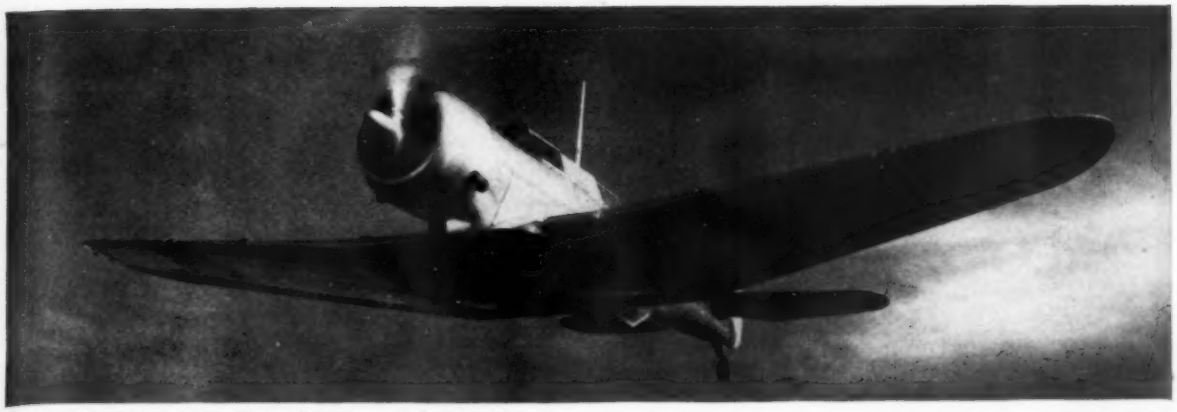
The cowl is quickly and easily removed.

The Author and his "Pacer," which flew 13 min. 20 sec.


BATTERY BOX
WR
CONDENSER
COIL MOUNTED IN 1/4 SHEET
TIMER FASTENED TO 1/4" SHEET FLOOR
WIDTH UP TO SECTION 5 2 3/4"
1/8" SQ. COWL GUIDES
GROOVED BASSWOOD
3/32" PLYWOOD BULKHEAD
MOTOR MOUNT BLOCKS ARE 3/8" X 1/2" X 3 1/2" BASSWOOD
NOSE DETAIL
BATTERY BOX DETAIL
BATTERIES HELD BY RUBBER BANDS BETWEEN PINS
BRASS PLATE ACROSS TOP
BATTERY LEADS SOLDERED TO .030 WIRE SPRINGS
ADJUST RUDDER BY BENDING ALUMINUM
RUDDER ADJUSTMENT DETAIL
1/16" WIRE PIVOT CEMENTED IN RUDDER.
3/32" ALUMINUM TUBE CEMENTED IN BODY.
1/16" PEG
1/8" DOWEL
1/4" SQ.
1/8" SQ.
"CRUTCH" 3/16" X 1/2"
1/8" X 3/16
3/32" STEEL WIRE
2 1/2" WHEELS
1/8" SHEET GUMWOOD
OPENING FOR TIMER ARM
TO TIMER POINTS
HIGH TENSION
PENLITE BATTERIES
GROUND
COIL
TIMER
CONDENSER
WIRING DIAGRAM
"CRUTCH" IS BUILT ON TOP VIEW
GUMWOOD
FUSELAGE DETAIL
1/8" X 1/4"
3/32" X 1/4"
ATTACH FORMERS, BULKHEADS WING REST, & STRINGERS
1/4" SHEET RUDDER OUTLINES
STABILIZER HAS 3/8" POSITIVE INCIDENCE
THE CLASS "B"
"PACER"
SCALE 1/4" = 1"
DESIGNED BY SAL TAIBI
DRAWN BY JACK MINASSIAN


③
1/8" x 1/2"
1/16" SHEET GUSSETS
1/8" SHEET AUXILLIARY SPARS
3/16" SHEET
1/4" SQ
1/16" SHEET
1/16" SHEET GUSSETS
1/8 SQ
1/16" x 3/16" CAP STRIPS
1/8" x 3/16
3/16" SHEET
2 1/2"
1/8" SHEET
3/16" x 3/16"
R1
R2
R3
R4
DIMENSIONS
STATION | ℄ TO TE | ℄ TO LE
WING
R1 | 6 1/4" | 2 3/4"
R2 | 6 3/16" | 2 3/4"
R3 | 5 3/4" | 2 3/4"
R4 | 4 7/8" | 2 5/8"
TAIL
S1 | 5" | 4"
S2 | 5" | 3 7/8"
S3 | 4 7/8" | 3 7/16"
S4 | 4 9/16" | 3"
S5 | 4 1/8" | 2 1/2"
S6 | 3 3/8" | 1 7/8"
WING
REINFORCEMENT 1/8" SHEET
COWLING DETAIL
TOP
FRONT
SIDE
1"
ADJUSTMENT OPENING ON LEFT SIDE
3 1/2"
12 1/2"
14
6
1 1/4"
WING POLYHEDRAL
AUXILLIARY SPARS
ALUMINUM REINFORCEMENT
WING REST DETAIL
NOTE: STABILIZER HAS NEGATIVELY CAMBERED AIRFOIL.
RIBS ARE SHAPED AFTER ASSEMBLY
1/4" SQ
1 3/4"
1/8" x 1/2"
1/4" SHEET
S6
S5
S4
S3
S2
S1
S2
STABILIZER


4
3/16 x 3/8
F1
F2
2 REQ.
R4
R3
R1 & R2
WR
3/32
PLYWOOD
BULKHEAD
B 1,2,3,4, & 5
B6
15
REQ
3/32
SHEET
B7
B8
B9A
B9
MAKE 2 OF 1/4
SHEET FOR BODY
2 OF 3/16 SHEET
END AT DOTTED LINE
JACK MINASSIAN

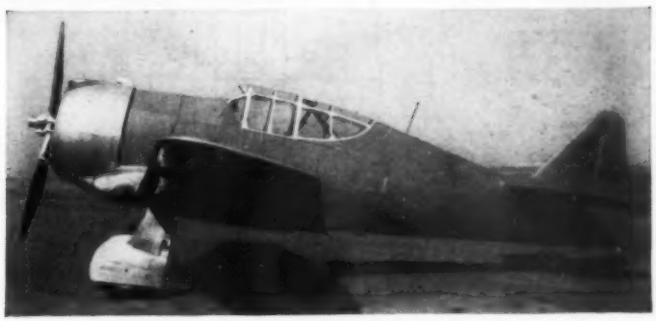


The new Douglas 8A-5 attack-bomber, first of 36 to be delivered to Norwegian military units at Toronto

FRONTIERS

Highlights of the Latest Developments in Aviation

By ROBERT C. MORRISON



The North American single-seat fighter NA-68 of improved design and with high performance

WE THINK certain parties in Europe, not to mention names, are rather surprised to see so many American airplanes of recent design in their midst at such an early date.

It was during the 1940 Battle of Flanders that the American airplane manufacturers were called upon to produce like they never produced before. One critic went as far as predicting that it would be five long years before they could get in high gear. However, it took them all of one summer and one autumn to get their factories built, complete rigorous test flights on the new designs and actually complete ships on a well-established production line! There are still some factory building programs under way, but by spring the beehive will have burst, and lo, behold the airplane in all its glory, in massive numbers. And they will come out like bees from a bee hive.

The new Waco C-8, powered with a Menasco C6S-4 of 290 hp., has a speed of 172 m.p.h.

At the moment, glamor is lacking as the newly-constructed warplanes leave the factory to cross the Canadian border. This is being done on a large scale already, but the undertaking is being accomplished in such a routine and "cock-sure" manner that few people outside of the vicious circle are aware of the undue activity. It is an impressive sight to see the rows of Douglas "Bostons," arrayed in their camouflaged warpaint, lined up on the field ready to be delivered to a country at war. It is even more impressive to watch one take off on its first test hop, or see them leave for Canada en masse. As they streak through the skies with wheels up there is little noise and plenty of speed, and they leave one with the impression that

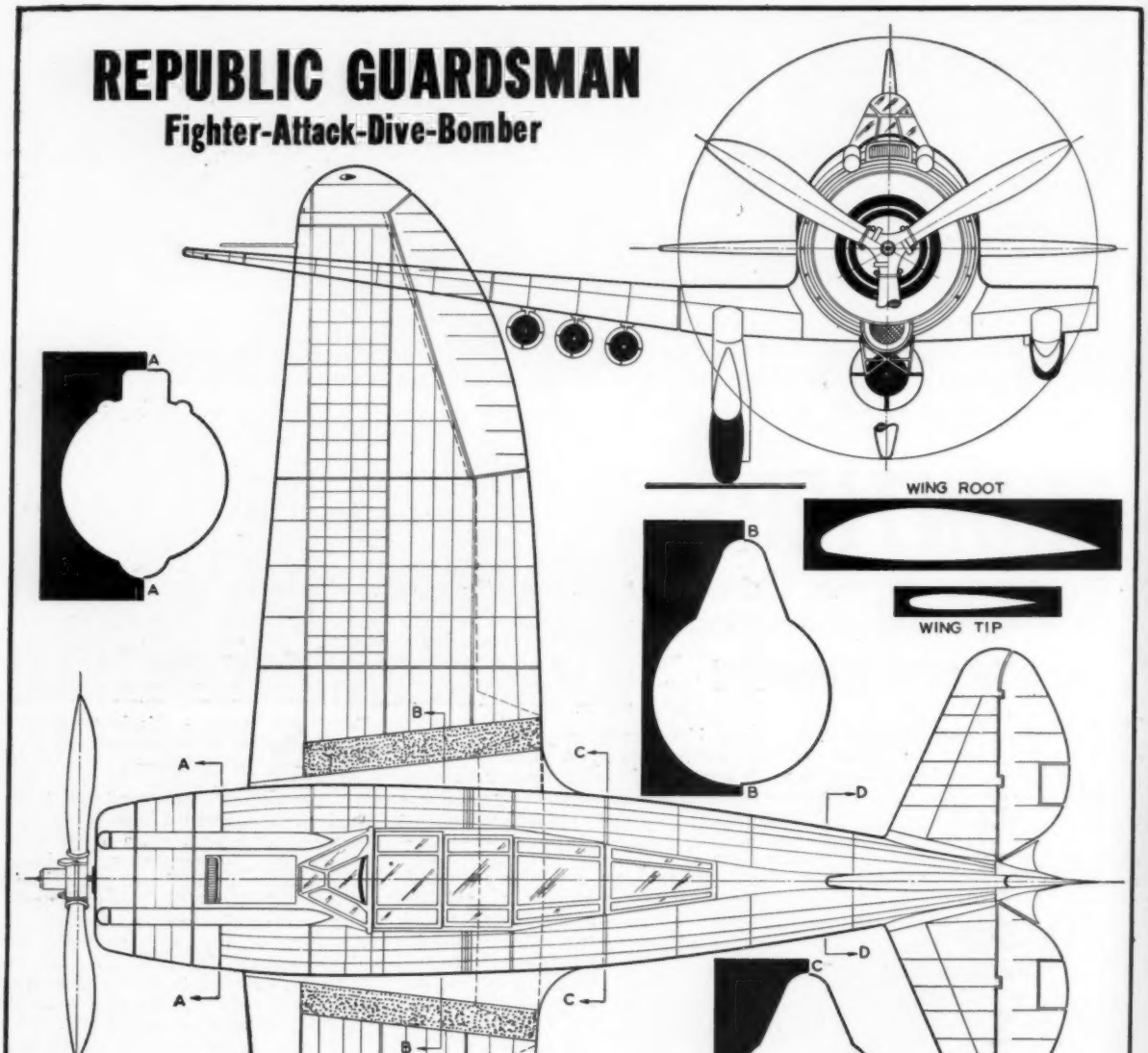
(Continued on page 42)

A scene in the Phillips and Powis plant in England where Miles Masters planes are turned out on a production basis. (Acme)

Gen. H. H. Arnold and Gen. G. H. Brett examine model of a new twin-engine bomber with four-bladed props. (Acme)

REPUBLIC GUARDSMAN

Fighter-Attack-Dive-Bomber



Guardsman of the Sky

PLANE ON THE COVER

The Republic Guardsman attack-dive-bomber ready for action

GIANT air forces utilize especially designed airplanes for highly specialized flying jobs. In any large air force today there is to be found from eight to twelve different types of flying equipment each fitted out and equipped for a very special job of flying. However, this is not true of the small air force, the aerial defense of small nations, such as are found to the south of us and in the far east. In these tiny countries, a dozen airplanes of which may constitute their entire air force, a single plane is called upon to do all the jobs of fighting, bombing, scouting, patrol, observation, etc. And thus was born the multi-purpose fighting plane, the jack-of-all-trades combat airplane.

Stearman's sturdy bi-planes, North American's rugged monoplanes and modified commercial craft such as the famed Waco WHD and Spartan "Zeus" all-purpose combat planes have found purchasers among the "little brother" nations. However, stand-out

ROBERT McLARREN

leader in the field is newly-formed Republic Aviation Corporation of Farmingdale, Long Island, New York, whose wicked "GUARDSMAN" is shown slanting across our cover this month. For the Republic "Guardsman" is the two-seat fighter-attack-dive-bomber Plane on the Cover for February.

GENERAL ARRANGEMENT: The Guardsman is a sleek, low-wing two-seater monoplane arranged in the conventional manner with the pilot located high and well forward behind the big, radial air-cooled motor. The rear-gunner is situated in the midpoint of the fuselage and the plane is equipped with forward and rear-firing guns, retractable landing gear, bomb racks and complete signaling equipment.

POWER PLANT: Power is supplied by a Pratt & Whitney "Twin Wasp Senior" double-row radial air-cooled motor model S3C3-G released by the United States Army Air Corps under military license. It is supercharged with the blower geared 8 to 1 with the crankshaft. It is rated 950 horsepower at 37.5 inches of mercury manifold pressure at 2700 r.p.m. (engine speed) at 14,300 feet altitude. At sea level it develops 950 horsepower at 40.5 inches of mercury manifold pressure at 2700 revolutions per minute. For take-off and five minutes duration this huge engine is capable of 1100 horsepower at 48.0 inches of mercury manifold pressure at 2700 r.p.m. Fuel consumption is .470 pounds of 95 Octane gasoline per brake horsepower or about 75 gallons per hour at 64% full throttle, which is the best cruising setting. It has a total weight of 1435 pounds in the full dry condition and it is geared to the big Hamilton Standard

(Continued on page 52)

Academy of Model Aeronautics

A Division of the National Aeronautic Association

OFFICIAL MODEL AIRPLANE NEWS

M.A.N.–I.G.M.A.A. TROPHY TO GO FOR HIGHEST RECORD

I.G.M.A.A. Trophy

The famed I.G.M.A.A. Trophy, originally established by MODEL AIRPLANE NEWS and presented to the I.G.M.A.A. member making the longest flight in an N.A.A. sanctioned model competition, has been turned over to the Academy of Model Aeronautics for custody.

The award will be presented in the future to the licensed gas modeler establishing the highest record in each calendar year for any type of gas model recognized under the regulations that exist for that particular year. In other words, in January of each year the trophy will be awarded to the Aeromodeler who, during the previous twelve months, has established the highest time in an Academy sanctioned competition.

As we go to press, the recipient for the award for 1940 competition appears to be 15-year-old Bobby Davis, of Atlanta, Ga., who established a three-flight average record of 21 minutes, 33.8 seconds.

All licensed gasoleers are eligible to compete for this trophy whenever they participate in formal sanctioned meets. They qualify when they set a national record and the best national record in any category, regardless of age or model size, will be awarded the trophy.

Mr. Charles H. Grant, Editor of MODEL AIRPLANE NEWS, has asked "that all records, correspondence concerning the trophy be sent to Academy Headquarters."

Larner Defines A.M.A.

"As you know, the work of the Academy is becoming better known. In fact, a unanimous resolution was adopted at the N.A.A. Denver Air Congress urging that N.A.A. chapters and all air-minded individuals throughout the country support the Academy in its undertakings.

"The Academy is not a governing body dictating to its members. Rather, it is composed of chapters and individuals whose support justifies its existence and whose record is such that its growth is directly traceable to the benefits passed on to its members —benefits made possible through their cooperation and their hard work, not just on behalf of the Academy but also on behalf of model aviation progress in this country." —COLONEL G. deFREEST LARNER, General Manager, National Aeronautic Association.

A.M.A. Headquarters Folk Get Around!

As the year neared its end, A.M.A. headquarters folks recently took time out to count up the trips made to confer with model leaders and to attend contests since January 1, 1940. In spite of the fact that the main office in the Willard Hotel (and before April 1, at Dupont Circle), Washington, was open every working day, members of the staff traveled more than 15,000 miles during 1940.

In running up this mileage, representatives went to such points as Asbury Park, Berlin, and Lakehurst, N.J.; Bailey's Crossroads and Hybla Valley, Va.; New Orleans, La.; Chicago, Ill.; Boston and Saugus, Mass.; Baltimore, Silver Spring, and Loch Raven, Md.; Clarksburg, W.Va.; Philadelphia and Harrisburg, Pa.; and New York City. Conveyances utilized included buses, automobiles, airplanes, trains, boats,

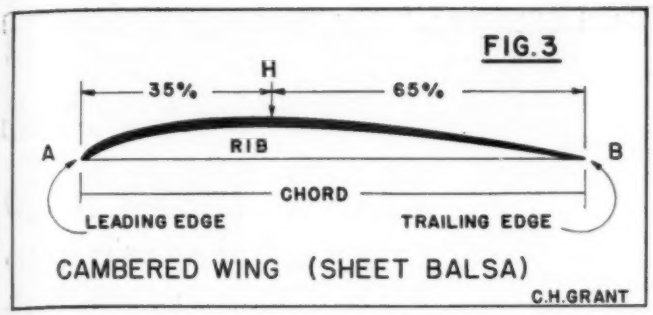
(Continued on page 40)

MODEL AIRPLANE NEWS - MODEL AIRPLANE ENGINE DIRECTORY FOR 1941

NAME	CLASS	WEIGHT IN OZ.		DISPLACEMENT IN CUBIC INCHES	BORE	STROKE	CYCLE	PORTS	RATED H.P	R.P.M.	FUEL	PARTS	PROPELLER		TYPE OF MOUNT	TYPE OF GAS FEED	MINIMUM WEIGHT OF PLANE IN OZ.
		BARE	FLYING							MIN - MAX.	GAS WHITE	OIL SAE-70	DIAM.	PITCH			
AJAX	C	6.5		.363	3/4	13/16	2		1/6	500-8000	3	1	13	7	BEAM-RADIAL	SUCTION	29.0
ALTERNATE FIRING TWIN	C		19	326	5/8	17/32	2	4	1/5	500-8000	4	1	14	8	BEAM	SUCTION	26.1
AVION "MERCURY"	C	19.5	28	1.53	1-1/4	1-1/4	2		3/4	500-3800	4	1	20	10	BEAM	SUCTION	122.4
ATOM	A	2.0	3.5	.097	1/2	1/2	2	9	1/10 1/8	250-17,500	3	1	10	6	BEAM	SUCTION	7.76
BANTAM	A	3.2	7.1	.165	19/32	19/32	2	3	1/8	500-8000	3	1	10	6	BEAM	SUCTION	13.2
NEW BANTAM	A	3.2	7.1	.199	.656	.590	2	DISC VAL.	1/7	250-9350	3	1	9-11	6-7	BEAM	SUCTION	16.0
BARKER "A"	C	12	18	.69	15/16	1	2	3	1/4	1000-7000	3	1	15	10	BEAM	GRAVITY	55.2
BARKER "B"	C	12	18	.69	15/16	1	2	3	1/4	1000-7000	3	1	15	10	BEAM	SUCTION	55.2
BARKER "C"	C	10	16	.69	15/16	1	2	3	1/4	1000-7000	3	1	15	10	BEAM-RADIAL	SUCTION	55.2
BRAT	A	3.3	8	.152	9/16	5/8	2	4	1/8	500-8000	3	1	9	6	BEAM	SUCTION	12.4
BROWNIE "E"	B	5.5	8.75	.291	.77	.625	2	3	1/7	900-8000	3	1	10-12	6-7	BEAM	SUCTION	23.3
BROWN "B", "C", & "D"	C	6.5	21.5	.6	7/8	1	2	4	1/5	500-7000	3	1	14	8.5	BEAM	SUCTION	48.0
BELMONT	C	9	22	.564	7/8	15/16	2	4	1/4	— 8600	4	1	14	8.5	BEAM	SUCTION	45.1
BULLET (PHANTOM)	B	4.5	8	.276	3/4	5/8	2	2	1/7	300-7000	2.5	1	11	7	BEAM	SUCTION	22.1
CHAMPION	C	10	21	.6	.925	.9	2	ROTARY V.	1/4	500-12000	2.5	1	13-16	8	BEAM	OPTIONAL	48
CYCLE "SUPER"	C	7.25	20	.647	15/16	15/16	2	" VALVE	1/4	1000-7300	3	1	13-14	6-8	BEAM	SUCTION	51.8
DENNYMITE	C	10	21	.563	.9	.9	2	4	1/4	500-6500	3	1	13-14	7.5-8	BEAM	SUCTION	45.0
DEMON	A	3.5	8	.152	9/16	5/8	2		1/10	250-12500	3	1	10-12	6-7	BEAM	SUCTION	12.7
DRAGON	B	6.5	11	.211	5/8	11/16	2	2	1/7	500-6500	4	1	10	6	BEAM	SUCTION	16.9
DRIMMIE "10"	C	8.5	18.5	.6	7/8	1	2	4	1/5	500-10000	4	1	14	8-10	BEAM	SUCTION	48.0
DWARF	B	4.5	9	.255	11/16	11/16	2	3 ROT.VAL.	1/7	500-10,000	2.5	1	11	8	BEAM	SUCTION	20.4
ELF "SINGLE"	A	3	6.24	.097	15/32	9/16	2	4	1/14	— 7500	4	1 SAE 20	8-9	5-6	BEAM	SUCTION	7.76
ELF "TWIN"	A	5	8.75	.198	15/32	9/16	2	4	1/7	— 7500	3	1 SAE 40	9-11	5-6	RADIAL	SUCTION	15.52
FEENEY "A"	C	15	24	1.18	1-3/16	1-1/16	4	OVERHEAD	2/3	300-9000	80-90 OCTANE		18	8	RADIAL	SUCTION	94.4
FEENEY "B"	C	13.5	22.5	.914	1-1/16	1-1/32		VALVES	1/2	300-9000	STRAIGHT GAS		15	6	RADIAL	SUCTION	73.1
FEENEY "C"	C	12	21	.617	15/16	7/8		"	1/3	300-9000	"		12	6	RADIAL	SUCTION	49.4
FORSTER SUPER 99	C	15	25	.997	1-1/16	1-1/8	2	4	1/2	AT 6000	10	1	15-18	6-10	BEAM	SUCTION	79.8
FORSTER "29"	B	5.75	10.75	.297	.750	.672	2	ROT. VAL.	1/5	500-9400	4	1	11-12	6-7	RADIAL-BEAM	SUCTION	23.96
G.H.Q.	C	10	20	.518	15/16	3/4	2	4	1/5	300-7000	5	1	14	8	BEAM	SUCTION	41.45
GNAT	A	4.5	8	.152	9/16	5/8	2	4	1/10	AT 7500	3	1	10-12	6-7	BEAM	SUCTION	12.7
GWIN AERO	C	7.25	10.75	.45	7/8	3/4	2	4	1/5	AT 8500	2	1	13	6.5	BEAM	SUCTION	36
HURLEMAN	C	6.7	21	.46	7/8	13/16	2	4	1/5	500-8000	4	1	14	8.5	BEAM	SUCTION	36.8
HUSKY "JV"	A	2.75	6	.192	5/8	5/8	2	4	1/8	250-8000	3	1	11	8	BEAM	SUCTION	15.35
IMP G-9	C	9	14	.565	7/8	15/16	2	4	1/5	300-7000	3	1	13	7.5	BEAM	SUCTION	45.2
JAMES	C	8	22	.647	15/16	15/16	2	4	1/4	AT 7000	4	1	13	7.5	BEAM	SUCTION	51.8
KAYDET	A	4	8	.163	5/8	17/32	2	4	1/7	500-8000	3.5	1	10-12	6-7	BEAM	SUCTION	13.05
LITTLE DYNAMITE	C	6.5	21.5	.375	.781	.781	2	ROT. VAL.	1/5	AT-6000	3	1	14	8.5	BEAM	OPTIONAL	30.0
MARVIN	A	5	8	.140	9/16	9/16	2	3	1/10	250-12000	4	1	9	6	BEAM	SUCTION	11.2
MAY "SILVER KING"	C	7	12.5	.454	13/16	7/8	2	2	1/5	600-12000	3	1	13	6	BEAM	SUCTION	36.3
MADEWELL	A	4	8	.140	9/16	9/16	2	4	1/8	400-8000	3	1	9	6	BEAM-RADIAL	SUCTION	11.2
MEGOW	A	3.5	6.5	.192	5/8	5/8	2	4	1/7	2000-10000	4	1	9	4	BEAM	SUCTION	15.4
MINIATURE	A	2	4.5	.104	33/64	1/2	2	2	1/12	300-3500	4	1	10	8	BEAM	SUCTION	8.32
M & M	B	4.5	11	.292	23/32	23/32	2	4	1/7	500-8000	3	1	11.5	8.5	BEAM	SUCTION	23.39
OHLSSON "19"	A	4.75	8.5	.197	11/16	17/32	2	3	1/7	500-7000	3	1	9-10	5	BEAM-RADIAL	SUCTION	15.8
OHLSSON "23"	B	5	9	.232	11/16	5/8	2	3	1/6	500-7500	3	1	10-11	6	BEAM-RADIAL	SUCTION	18.4
OHLSSON "60"	C	10	19.5	.617	15/16	7/8	2	3	1/4	500-7500	3	1	14-15	10	BEAM-RADIAL	SUCTION	49.4
O.K. TWIN	C	18	33.5	1.209	.9	.95	2	3	1/2	500-5500	4	1	18-20	10-12	RADIAL	GRAVITY	96.7
O.K. DELUXE	C	7.25	18	.616	.9	.969	2	3	1/5	500-10,000	3.5	1	14-15	8.5-10	BEAM-RADIAL	SUCTION	49.3
O.K. STANDARD	C	7.75	18.5	.604	.9	.95	2	3	1/5	500-10,000	3.5	1	14-15	8.5-10	BEAM-RADIAL	SUCTION	48.3
O.K. SPECIAL	C	7.25	18	.604	.9	.95	2	3	1/5	500-10,000	3.5	1	14-15	8.5-10	BEAM-RADIAL	SUCTION	48.3
O.K. '49	C	8	14	.493	.9	.775	2	3	1/5	500-12,000	3.5	1	13-14	8	BEAM-RADIAL	SUCTION	39.44
PRICE MIDGET	B	3.5	7.5	.24	11/16	21/32	2	3		500-7,500	2.5	1	11	8	BEAM	SUCTION	19.2
PERKY	A	3		.191	39/64	5/8	2		1/8	700-12,000	3	1	10	7	RADIAL	SUCTION	15.28
REBEL	B	4.5	8	.23	5/8	3/4	2	4	1/7	350-5000	3	1	10 11	6 7	BEAM	SUCTION	18.4
RANGER	B	3.8	7.75	.292	.69	.782	2	4	1/6	250-10,750	4	1 S.A.E. 60	13	7	BEAM	SUCTION	23.4
SKY CHIEF	C	10	14	.526	7/8	7/8	2	4	1/5	1800-9000	4	1	14	7	BEAM	SUCTION	42.1
SYNCRO "ACE"	C	10	21	.564	7/8	15/16	2	4	1/5	AT-10,000	4	1	13	7	BEAM-RADIAL	SUCTION	45.1
SYNCRO "BEE"	A	3.75	8	.122	1/2	5/8	2	4	1/8	1000-8000	4	1 S.A.E. 60	9	6	BEAM-RADIAL	SUCTION	9.76
SYNCRO B-30	B	5.5		.292	13/16	9/16	2		1/7	700-10000	3	1	11	8	BEAM	SUCTION	23.36
TIGER AERO	C	7.25	10.75	.45	7/8	3/4	2	4	1/4	AT 10,000	2	1	12	6.5	BEAM	SUCTION	36
TORPEDO	B	4.75	8.5	.299	.725	.724	2	2	1/6	300-8000	2.5	1	11	8	BEAM-RADIAL	SUCTION	23.92
TROJAN	B	5	9	.232	11/16	5/8	2	4	1/7	AT 6500	4	1	10	6	BEAM	SUCTION	18.56

MANUFACTURER'S FIGURES FOR BORE AND STROKE HAVE BEEN USED TO CALCULATE THE PISTON DISPLACEMENT BY MEANS OF THE FORMULA CU=(0.7854)B².S.N.; IN WHICH B=BORE, S=STROKE, AND N=THE NUMBER OF CYLINDERS NOTE: ALL ENGINES LISTED IN THIS DIRECTORY ARE BLOCK-TESTED BEFORE SHIPMENT.

JESSE DAVIDSON



MODEL DESIGNING SIMPLIFIED

By CHARLES HAMPSON GRANT

How to Build Your First Power Plane—Making the Layout of the Structure to Embody the Aerodynamic Factors

Article 3

IN THE last Article No. 2, the design of a beginner's simple power-driven plane was outlined: the basic size, shape, and relative position of its parts having been determined. The next step is to make working drawings of the model, embodying all of these basic characteristics. Many model-builders just build their airplane without first taking the precaution of laying out the design carefully on paper. This results usually in a misproportioned and unsuccessful plane.

Actually, it is a very simple task to make simple working drawings and the result, when a plane is built from such drawings, is usually gratifying. Three layouts of your plane should be made: (1) a plan view, (2) a side view, and (3) a front view, all showing the relative position, size, and shape of the parts. It makes your task simpler also to make three view drawings of the parts themselves, such as, the angle of incidence block which supports the wing at the proper angle relative to the motor stick. In complicated drawings, it is difficult to determine accurately the measurement of these smaller parts from assembly layouts. The task is made easier by making larger full-scale drawings of them.

Following is a list of the required plane characteristics determined in the last Article and which must be incorporated in the drawings:

Wing span	21 "
Wing chord	3 "
Tail moment arm	10½"
Stabilizer span	9.5 "
Stabilizer chord	2⅜"
Wing camber height	¼"
Fin height	3⅜"
(1.42 times the width)	
Fin width	2⅜"
Wing dihedral—1" per foot of span—That is, each wing tip should be elevated above its center point 1¾".	
Wing angle of incidence	2°
Stabilizer angle of incidence	0°

The nose length distance—that is, the distance from the center of the wing to the propeller bearing—6-5/16".

The propeller is to be cut from an oblong block of the following dimensions:

Length	8 "
Width	1½"
Depth	¾"

The length of the landing gear should be sufficient to provide 1" of clearance between the lowest point of the propeller blade tip circle and the ground when the motor stick is in a horizontal position.

The drawings of your plane should embody each and every one of these aerodynamic characteristics. However, the material from which the parts are made and the way they are put together have an important bearing upon the structural design of your craft. In laying out the plans on the drawing board, it is wise to first establish the approximate location of the various parts. However, it is necessary to have some idea of the character of the structure before this is undertaken.

General Structural Specifications

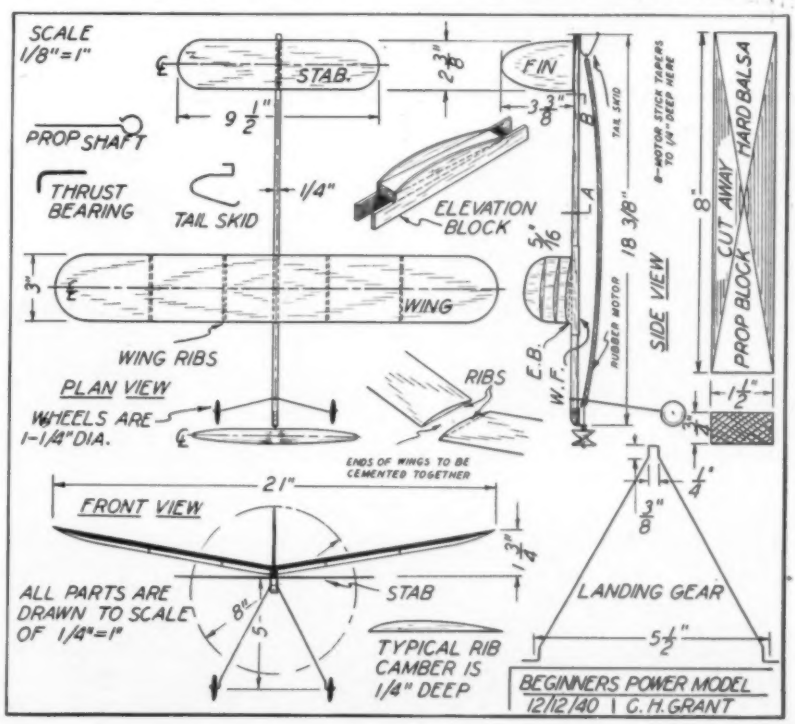
Briefly, the plane will consist of: a wing with the proportions specified—made from a sheet of balsa 3/64ths to 1/16th of an inch thick. The tail surfaces always should be as light as possible, yet strong. Consequently, they should be comparatively thin. They are to be made of balsa and if a very light grade is used, these may be 3/64ths of an inch thick. If heavy wood is used, their thickness should not be greater than 1/32nd of an inch.

The model is to be of the stick type. The length of the stick being equal to "N" plus "M" plus 1/2 the stabilizer cord, which equals 6-5/16ths, plus 10-1/2, plus 1-3/16th inches. Its cross section should be large enough to withstand the pull of the motor. A model of this size usually requires from 4 to 5 strands of 1/8 rubber to supply sufficient power. A stick of this length should have a width of 1/4" and a depth of 5/16" in order to stand the pull and tortion of this amount of rubber, provided it is made of fairly hard balsa.

Now we know enough about the aerodynamics and structure of the model to lay out the plans.

The first thing to consider is the scale to which they are to be drawn. If drawn full size, a sheet of paper and drawing

(Continued on page 58)



GAS LINES

AIR WAYS

NEWS OF MODELS AND BUILDERS FROM ALL PARTS OF THE WORLD

Pict. 1. (Left) Roy Jacobs' ship takes wing

ANYONE who has ever flown gas models in Vermont will know the tremendous difficulties with which fliers contend. In most of the territory there is hardly sufficient level ground for a baseball diamond and one must resemble the species of "mountain goat" to retrieve the ships. Ninety-nine times out of a hundred the plane will land in the top of a tree, on a mountain or in some dense thicket which has little respect for a good-looking suit of clothes. Perhaps it is these obstacles that lend a sort of fascination and spirit of adventure to flying in this particular state.

These difficulties however have prevented the activity from becoming universal there. Consequently, model news from Vermont is a rare treat.

Here some is supplied by Mr. Roy M. Jacobs of 22 Coolidge Road, Springfield. He has sent us picture No. 1, which shows his Brown-powered "Clipper" in flight at the Springfield Airport. The ship has made everything from a two-minute to an out-of-sight flight on a 30-second engine run, and landed in all sorts of places. Mr. Jacobs says that the best landing field around there is the top of his head, for he is quite bald. Judging from his enthusiasm we may expect that he will not let the deep snow of this winter stop his model flying, so we look forward with anticipation to some news of models with skiis. We hope Mr. Jacobs tells us how he flies models when the weather is forty degrees below zero, for this was the temperature one day a number of years ago, in this vicinity; your editor can testify to this for he lived there.

Pict. 2. Broughton with his finless, dihedralled stabilizer, "Tiger"-powered gas job

Mr. Howard Broughton writes from 6714 McKinley Avenue, Los Angeles, Calif., and sends us picture No. 2, in which he is shown with his modified "Zipper." About 8 inches of extra span at the center of the wing and a novel "V" tail have been added. He says the climbing performance is even better than the original model. The wing loading is exactly 8 ounces. Fine results have been obtained with the "V" tail; in experiments using this feature he has found that the vertical projected area of the dihedralled stabilizer should be from 10 to 15% greater than the total rudder area figured for a single vertical fin. With this set-up the model rocks on its longitudinal axis on the climb and will whip suddenly into a tight corkscrew climb. In other words, instead of looking or assuming a straight climbing angle greater than the optimum, the ship will whip around without wasting time or horsepower.

The problem of spinning in from erroneous turn adjustments, common to a high parasol, is almost minimized since the ship will not assume a steady turn with the nose down. The dihedralled tail has no effect on the gliding characteristics. The adjustments are made by turning the entire stabilizer.

This little ship is powered with a Tiger engine which gives it great power.

Believe it or not, cowboys have taken up model flying. Apparently riding the range does not hold the thrills of the "old days" so they are supplementing their activities with a few "gallops through the clouds." As proof, picture No. 3 shows Gene Autry, "Public Cowboy No. 1,"

Pict. 3. Screen-cowboy Gene Autry and Jack Bayha with the model Jack designed for Gene

Pict. 4. Charlie Bristol (left) of Cheyenne and Ted Holmes of Denver compare notes at the Denver Contest

Pict. 5. The Denver Exchange Gas Model Club fliers get together for a Sunday outing

Pict. 6. Doug Collis is active in Canada

Pict. 8. A mechanical pilot which makes the little ship, shown in the picture, dive and loop with precision.

Pict. 9. Lt. Sherman with his "dummy pilot" model

Pict. 10. The realistic model and pilot

Pict. 11. Here you see the weighted pilot in the cockpit of Sherman's model

Hollywood's colorful contribution to the motion picture world. He is looking over the "Gene Autry Special" gas job designed by Jack Bayha, shown at the right. The model is a most versatile one and can be easily converted into an amphibian, seaplane, skiplane or regular land ship. It is powered with a 1/10 hp. Atom engine.

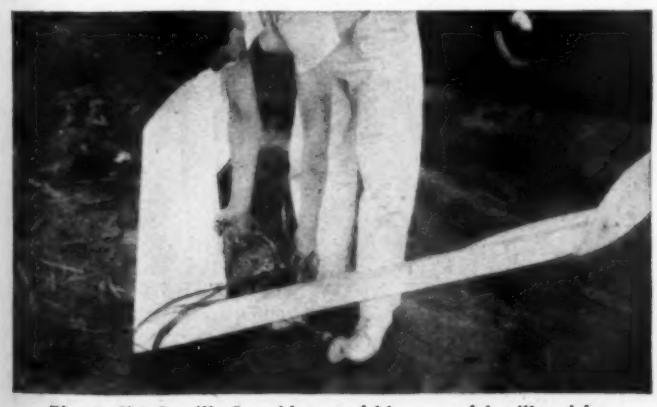
One hardly thinks of Denver, Colorado, as a center of model activity. However fliers of this town have held two world championships even though they have been handicapped by loss in the horsepower and lift of their planes, due to being at an altitude of 5280 feet or just one mile. This is quite a center of model interest and news has come of one of the contests held late in September—rather belatedly but still interesting. A crowd of about 2000 spectators watched 63 model fliers go through their paces. Contestants came from Denver, Fort Collins, Pueblo and Cheyenne, Wyoming. The meet was sponsored by the "Rocky Mountain News" and the Exchange Gas Model Club, both of Denver. R. W. Shouse of Pueblo won first place with a time of 1' 59.4". A. K. Holmes and Ted Holmes, father and son, of Denver, vied for second and third places.

Picture No. 4 shows one of our old friends, Charlie Bristol of Cheyenne, discussing model problems with Ted Holmes of Denver.

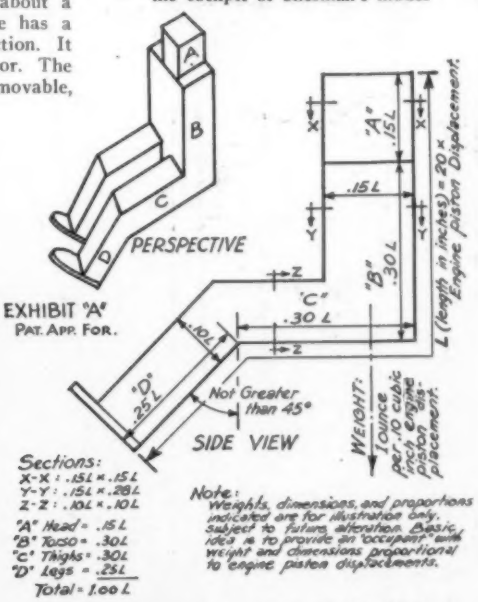
The most active group in the state is the Exchange Gas Model Club which originally was one of the first I.G.M.A.A. units. Now it is a chapter of the Academy of Model Aeronautics. Flying is carried on every Sunday at a field located about 14 miles from town. The club meets twice a month at the Brown Palace Hotel in the Senior N.A.A. clubroom. Any gas model builder in or near Denver is invited to attend the Sunday morning flying competitions. Mr. F. J. Highberg of 4510 Elm Court is secretary. Being an Exchange Club, it believes that an exchange of ideas is beneficial to all and would like to hear from other clubs throughout the country. A weekly news-sheet, called "Flight," is distributed among the members. Picture No. 5 shows a group of club members at one of the Sunday contests.

Picture No. 6 shows Doug Collis of the Victoria Model Airplane League, with one of his latest gas models. The club to which he belongs is one of the most active in Canada and can boast of about 85 members, ranging from 9 to 21 years. Activities have been confined mostly to rubber powered planes; however lately a number of members have built gas jobs, of which the club now boasts about a dozen. The plane in the picture has a wing with an N.A.C.A. 6409 section. It is powered with a Phantom motor. The bottom of the fuselage is removable, which part contains the entire engine unit. This ship was the winner in Class B at the Victoria Model Airplane League Contest.

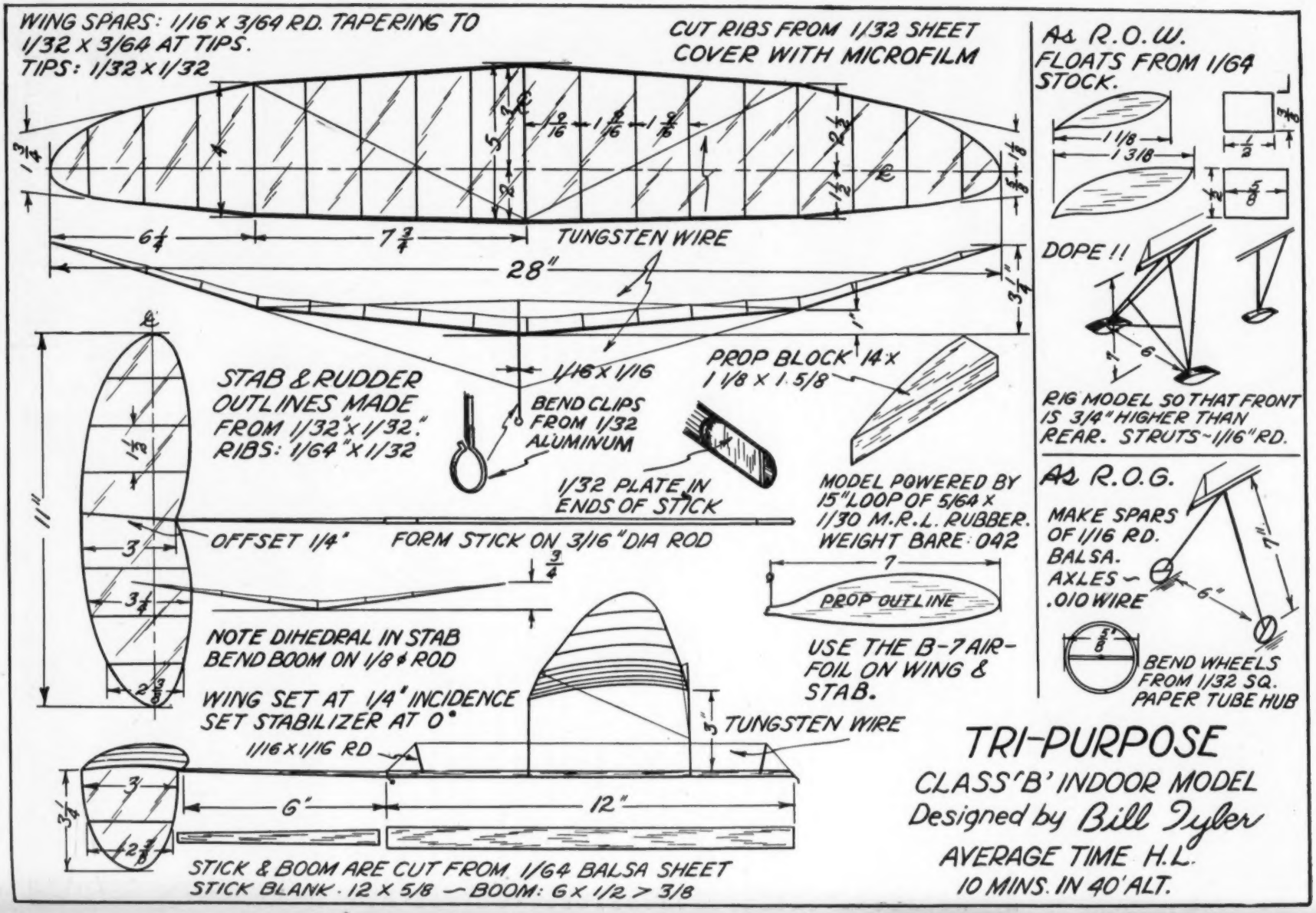
Picture No. 7 shows Jim Scoville, Jr., of 1505 Bouton

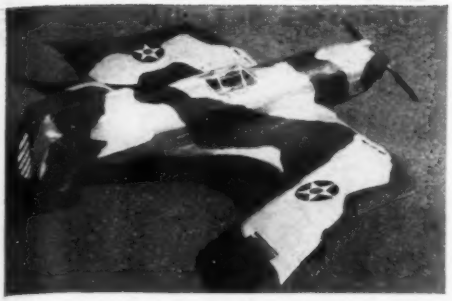


Pict. 7. Jim Scoville Jr. with one of his successful tailless jobs

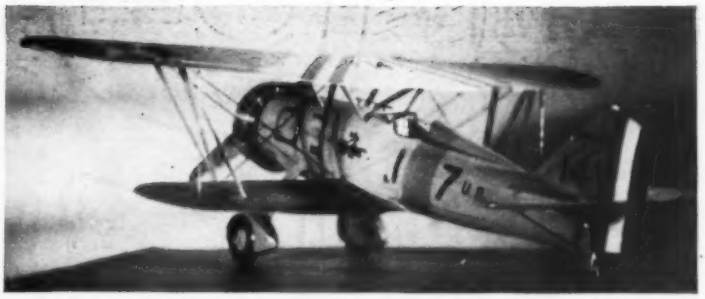


PROPOSED DUMMY OCCUPANT FOR MODELS POWERED BY INTERNAL COMBUSTION ENGINES.

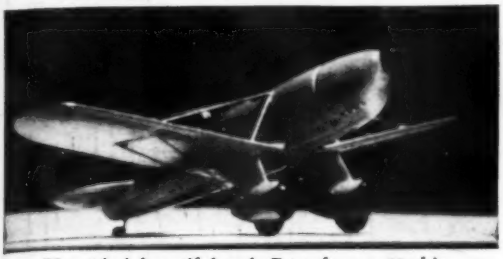

WING SPARS: 1/16 x 3/64 RD. TAPERING TO 1/32 x 3/64 AT TIPS.
TIPS: 1/32 x 1/32
CUT RIBS FROM 1/32 SHEET
COVER WITH MICROFILM
TUNGSTEN WIRE
28"
STAB & RUDDER OUTLINES MADE FROM 1/32" x 1/32." RIBS: 1/64" x 1/32
1/16 x 1/16
BEND CLIPS FROM 1/32 ALUMINUM
1/32 PLATE IN ENDS OF STICK
PROP BLOCK 14 x 1 1/8 x 1 5/8
OFFSET 1/4"
FORM STICK ON 3/16" DIA ROD
NOTE DIHEDRAL IN STAB
BEND BOOM ON 1/8 ø ROD
WING SET AT 1/4" INCIDENCE
SET STABILIZER AT 0°
1/16 x 1/16 RD
TUNGSTEN WIRE
6"
12"
STICK & BOOM ARE CUT FROM 1/64 BALSA SHEET
STICK BLANK - 12 x 5/8 — BOOM: 6 x 1/2 > 3/8
MODEL POWERED BY 15" LOOP OF 5/64 x 1/30 M.R.L. RUBBER.
WEIGHT BARE: 042
PROP OUTLINE
USE THE B-7 AIR-FOIL ON WING & STAB.
As R.O.W.
FLOATS FROM 1/64 STOCK.
DOPE !!
RIG MODEL SO THAT FRONT IS 3/4" HIGHER THAN REAR. STRUTS - 1/16" RD.
As R.O.G.
MAKE SPARS OF 1/16 RD. BALSA.
AXLES - .010 WIRE
BEND WHEELS FROM 1/32 SQ. PAPER TUBE HUB
TRI-PURPOSE
CLASS 'B' INDOOR MODEL
Designed by Bill Tyler
AVERAGE TIME H.L.
10 MINS. IN 40' ALT.



Pict. 12. An original pursuit model by William Samph



Pict. 13. Lawrence Cook's beautifully built detail scale Curtiss F11C-4 model



Pict. 14. A beautiful scale Ryan from a 10c kit

Road, Troy, New York, testing his tailless gas job for the C.G. location; he is a bug on this type of ship. On the first flight the model flew very well and was extremely stable. Jim says it is even steadier than the conventional type, which is not unstable. Unlike most tailless jobs, the angle of incidence is constant throughout the wing. The longitudinal stability is gained through a sweepback of 38 degrees and wing tip flaps. Regardless how rough the field, the model has never nosed-over on landing.

Jim is now a Sophomore aeronautical engineer at the Rensselaer Polytechnic Institute and is supplementing his course with a little practical experiments with his ship: Not a bad idea, even though some of our educational potentates are a little slow in grasping the benefits derived from such practice. We might put the matter in other words: "All theory and no practice make good crack-up engineers."

Apparently some of the model builders are giving their airplanes "the works." That is, if we believe what we see in picture No. 8. It isn't an alarm clock to wake up a sleepy motor, but rather a mechanical pilot made of aluminum and brass which, when properly installed and adjusted, operates the tail flippers at the proper moment to cause successive dives and loops. The timer at the right, which looks like a spool, sets off the device to operate the arm shown at the left. This arm, through the cables, moves the controls after five seconds of climb, causing

(Continued on page 62)

AIR YOUTH OF AMERICA

News of Importance to Modelers

New Series of Model Building Sessions Begun

Job Hints for Model Builders

The first of a new series of model plane building sessions will be inaugurated by Air Youth beginning on the sixteenth of January. This series of meetings, under the direction of Art Vhay, which will extend and continue the course begun last Fall for club leaders, will be held in the workshop facilities of the Museum of Science and Industry, at 30 Rockefeller Plaza.

Problems of rubber powered and gasoline model construction, the purchasing and handling of materials for clubs and similar topics will be discussed and illustrated in the course. Each person registering for the course will be given an opportunity to build a complete model plane. Tools and working materials will be provided. The group will meet on Monday evenings from 7:30 to 9:00 P.M. The extensive aviation exhibits and the facilities of the Museum will be available to those who participate in the course. In order not to crowd the workshop, however, it will be necessary to limit the number of those taking the course, and there will be a small registration fee.

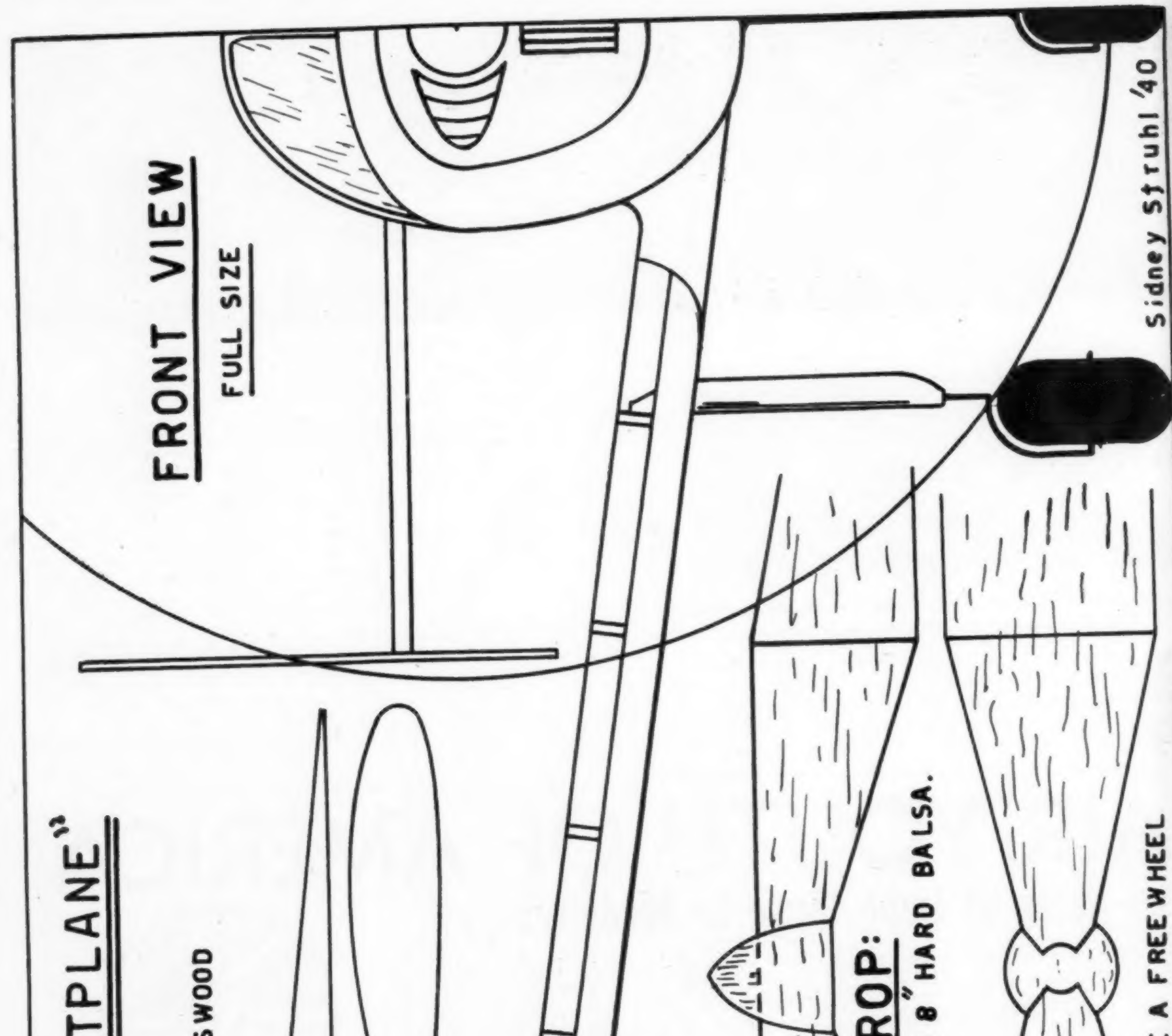
The men who completed the Fall series of Air Youth sessions were awarded an official Air Youth certificate in recognition of their having successfully completed the primary course for junior aviation instructors. The first of these certificates was awarded Aaron D. England, Supervisor Miniature Aircraft, Westchester County Recreation Commission. Certificates of this type will be awarded to those who successfully complete the second session of the Air Youth school.

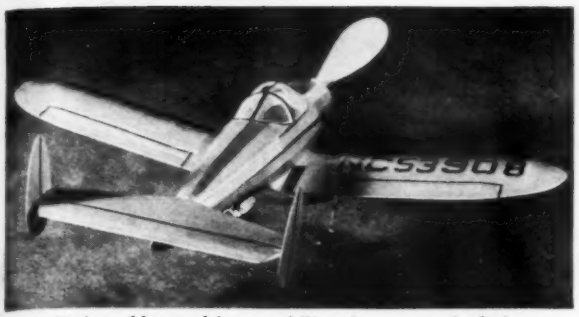
Students at Philip G. Vroom School follow Air Youth program

How to Get a Job in Aviation

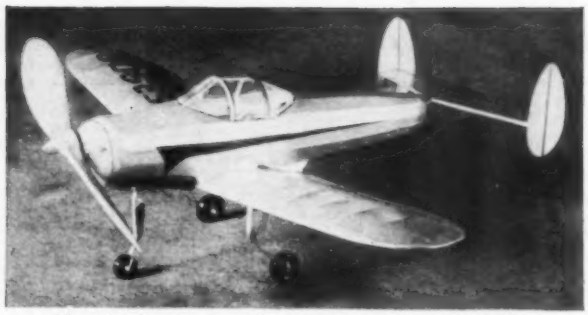
More and more model builders are getting jobs with the aircraft manufacturing plants. A large number are also employed by the NACA (National Advisory Committee for Aviation) in the governmental research laboratories, at Langley Field, Virginia. Recently the NACA issued a circular advertising vacancies for young men who have had training in model building. These jobs will pay

(Continued on page 65)


"THE ERCOUPE SPORTPLANE"
SCALE PROP. - BASSWOOD
1 1/2" DIHEDRAL UNDER EACH WING TIP
FRONT VIEW
FULL SIZE
PROP:
1"X1 1/4" X 8" HARD BALSA.
SIDE
TOP
USE A FREEWHEEL
Sidney Struhl '40



Twin rudders and large stabilizer insures steady flight



The tricycle gear provides smooth takeoffs and landings

How You Can Build One of the Most Realistic, Stable and Efficient Flying Scale Models Ever Designed

A Flying Ercoupe In Miniature

By SIDNEY STRUHL

OVER the horizon comes the new "ERCOUPE," the lightplane that can be flown with utter simplicity and landed with extreme ease under any conditions and by any pilot.

Invading the $2,000 class, the Engineering and Research Corporation of Riverdale, Maryland has brought some startling developments for the lightplane enthusiast, that heretofore were unheard of in all preceding light and sportplanes. Just by looking at the Ercoupe you can see how radical it is, with its tricycle and twin rudders. It truly looks more like a modern pursuit ship than a cracker-jack lightplane.

The Ercoupe has amazing stability—it will not get out of control. Even with the wheel full back, straight flight can be maintained or turns performed at will. It is absolutely impossible to spin the ship. The quick take-off run, fast climb and high sustained cruising speed of the Ercoupe provides point to point transportation which will surprise and please the private pilot. On the ground, as in the air, the plane handles with great ease; no nose-overs are possible even with full application of the hydraulic brakes.

The structure of the Ercoupe is all-metal, as is the covering of all but the outer wing panels. The use of corrosion-resistant aluminum alloys in structure and covering brings to the lightplane pilot the dependability and freedom from maintenance of the large transport planes.

Powered with the Continental A-65 engine, the plane has remarkable performance with surprising economy. The maximum speed is 117 m.p.h. and the cruising speed is 105 m.p.h. Cruising range is 350 miles and the landing run is only 200 feet. Fuel consumption is but 4 gals. per hour.

Well proportioned for long flights

The ERCOUPE lends itself very nicely towards a flying scale model because of its simplicity of construction and adjusting for flight. A beginner who has only built one or two models before should have no trouble whatsoever in building the model.

Now for the construction. We shall start with the fuselage since it is the more complicated of the parts, and one likes to have the hardest job done quickly.

Fuselage

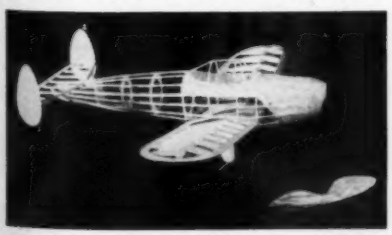
Two types of basic construction may be used in constructing the fuselage. One is the half-shell method and the other is the master-stringer method. We shall describe both methods but the beginner should find the half-shell method much simpler and easier.

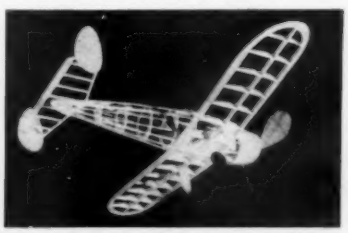
As for the master-stringer method, you will note that the one stringer that is shown in grain and marked MS is of 1/8" square balsa. This is the master stringer and the entire fuselage is built on these two stringers. You will have to cut the bulkheads out in one piece each and mark their positions on the two master stringers. The bulkheads are then cemented in their correct positions. After they have set, the remaining stringers are inserted in their correct positions. This may sound simple but it is quite difficult to get the fuselage lined up with this method.

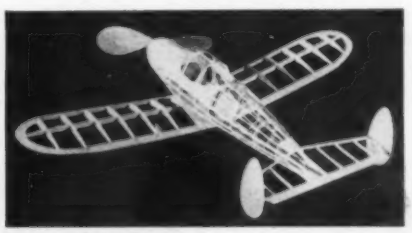
The half-shell method is far simpler although it does take a little more time. First cut out a complete set of fuselage bulkheads. You will notice that only one-half of each bulkhead is shown, except bulkhead A-A. Simply make two sets of the bulkheads shown.

Now join the two pages of the magazine and pin the bulkheads at right angles to the plans, making sure each former is in its correct position. Of course you cannot pin bulkhead A-A on the plan since it

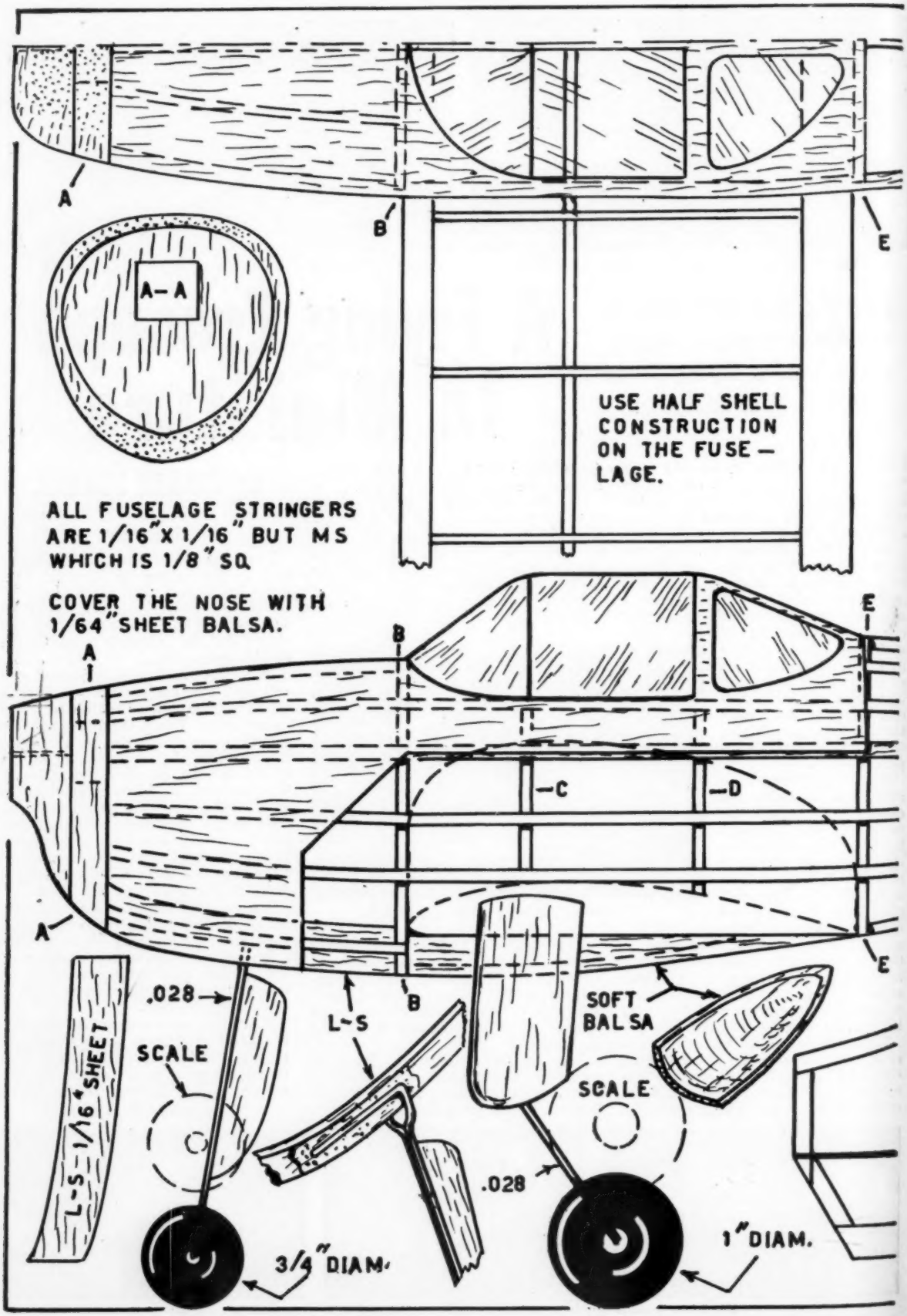
(Continued on page 48)

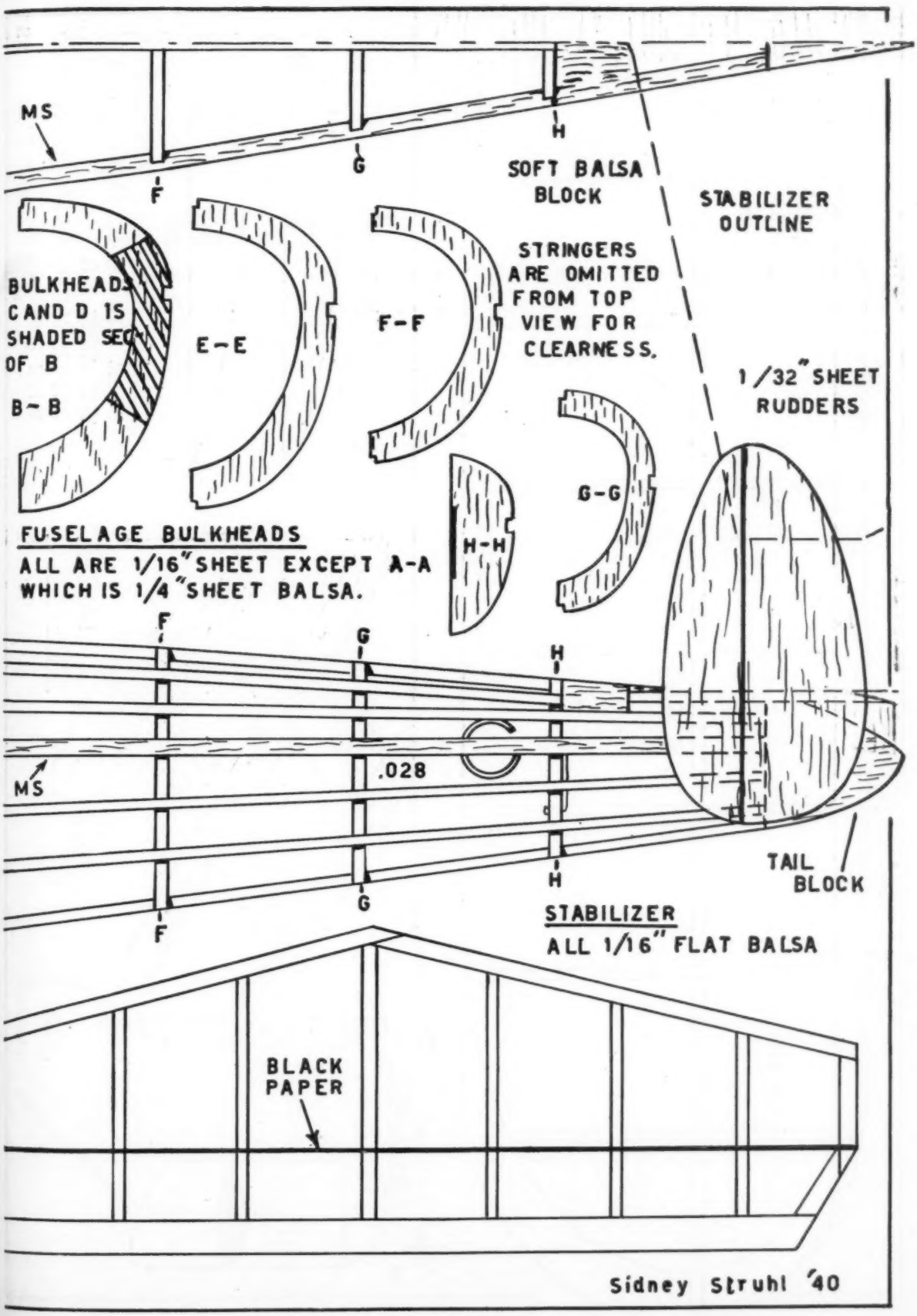


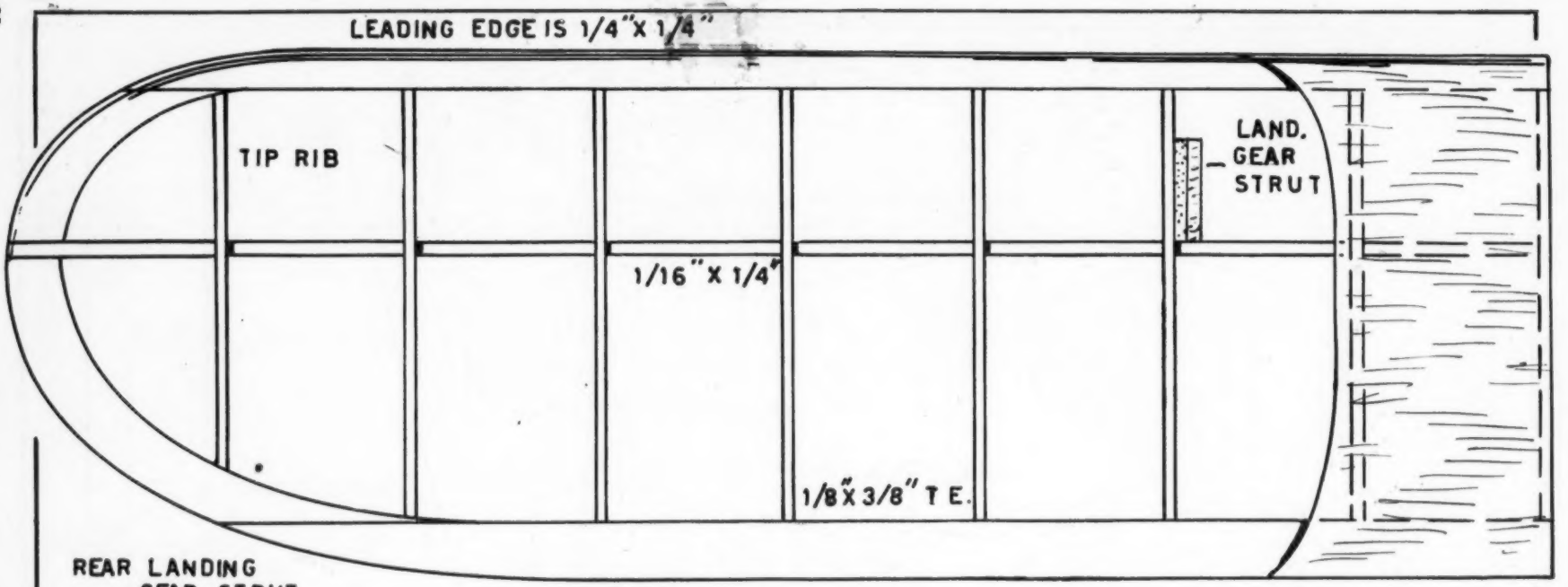




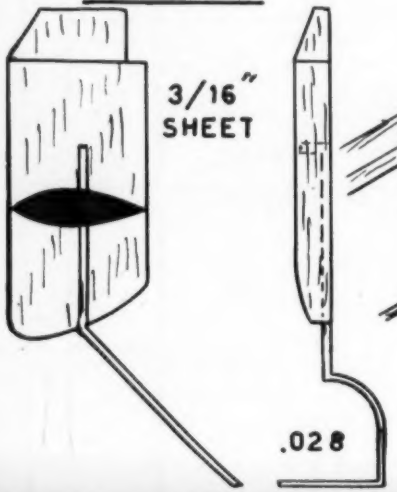
The frame work is simple yet strong enough to withstand many strenuous flying hours

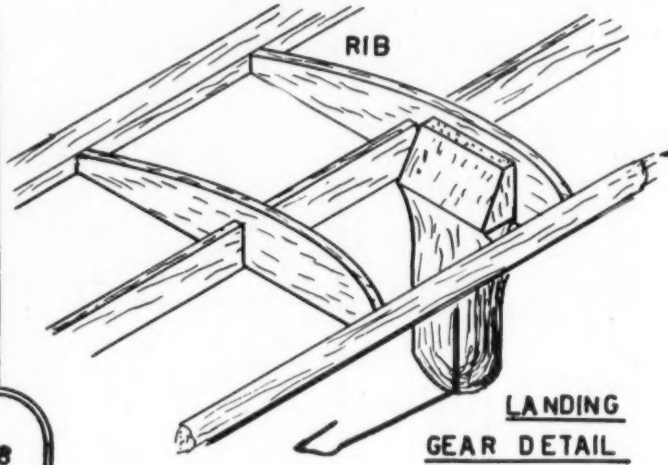

A
B
E
A-A
USE HALF SHELL CONSTRUCTION ON THE FUSE-LAGE.
ALL FUSELAGE STRINGERS ARE 1/16" X 1/16" BUT MS WHICH IS 1/8" SQ.
COVER THE NOSE WITH 1/64" SHEET BALSA.
C
D
.028
SCALE
L-S-1/16" SHEET
L-S
SOFT BALSA
3/4" DIAM.
1" DIAM.


MS
F
G
H
SOFT BALSA BLOCK
STABILIZER OUTLINE
STRINGERS ARE OMITTED FROM TOP VIEW FOR CLEARNESS.
BULKHEADS C AND D IS SHADED SEC OF B
B-B
E-E
F-F
G-G
H-H
1/32" SHEET RUDDERS
FUSELAGE BULKHEADS
ALL ARE 1/16" SHEET EXCEPT A-A WHICH IS 1/4" SHEET BALSA.
.028
TAIL BLOCK
STABILIZER
ALL 1/16" FLAT BALSA
BLACK PAPER
Sidney Struhl '40



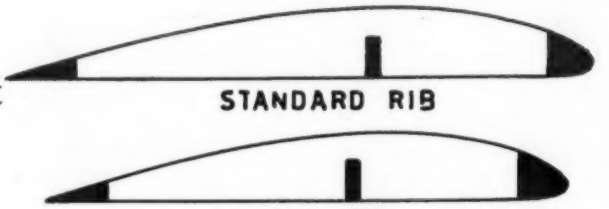
REAR LANDING GEAR STRUT





LANDING GEAR DETAIL

WING RIBS



ALL THE WING RIBS ARE CUT FROM 1/16" SHEET BALSA AS IS THE WING TIP.
COVER THE CENTER SECTION WITH 1/64" SHEET BALSA.

SS

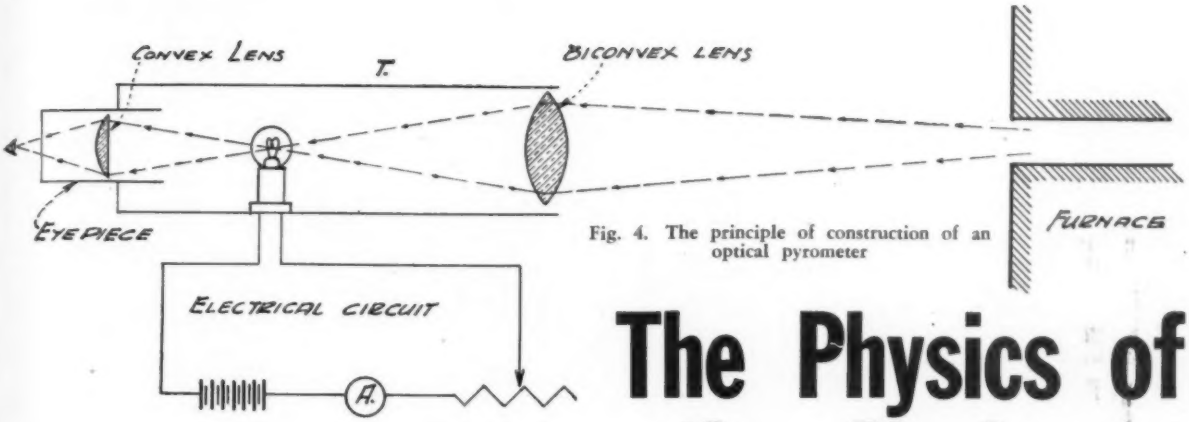


Fig. 4. The principle of construction of an optical pyrometer

The Physics of the Airplane

AIRCRAFT OPTICAL INSTRUMENTS

By LT. JAMES P. EAMES and WILLIS L. NYE

ARTICLE 18

THE basic element, of primary importance in any optical instrument, is its lens. A lens may be defined as a piece of glass or other transparent substance bounded by two surfaces commonly used to make rays of light convergent or divergent. Those of the former type can be immediately identified by the shape or outline of their convex surfaces, that is, they are thicker at the middle than at the edges. Both surfaces may be of convex outline or merely one, the other being flat. In like manner, diverging lenses can be recognized by their concave outline: that is, they are thinner at their middle section than at the edges. As in the former case, one or both surfaces may present a concave outline. Still further modifications of these primary types of lenses represent a compromise in that their surfaces combine the characteristics of both types, being, for instance, convex in one surface and concave in another. All of the above-mentioned forms of lenses are illustrated in Figure 1.

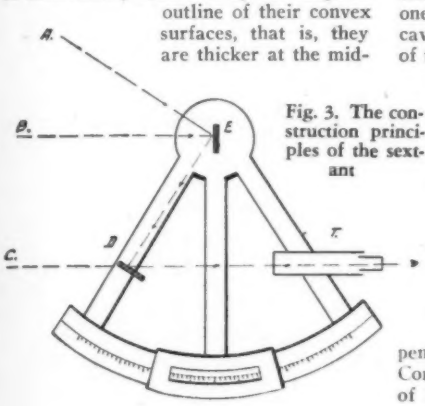


Fig. 3. The construction principles of the sextant

The two elementary forms have been named by the action of light on their surfaces. When entering a denser medium than air, as for instance the glass of the lens, a light ray will always be refracted in a direction that tends to become perpendicular to the original path of the ray. Conversely, a light ray entering a medium of less optical density is refracted away from the perpendicular. From the practical application of this simple principle we can readily perceive why a convex lens tends to bend a light ray towards the principal axis through the centerline of the lens and, in the reverse sense, why the concave-shaped lens bends it away from this axis. An easy way to remember this phenomena is to bear in mind that the light rays must always be bent toward the thicker part of the lens.

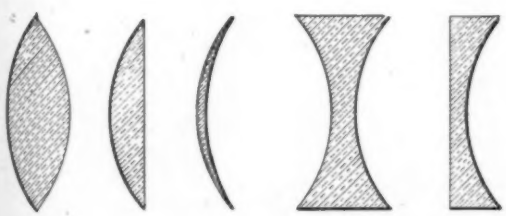


Fig. 1. Typical optical lens patterns

Through the employment of a convex lens three different effects become possible. Should an object be located at a considerable distance from a convex lens, the image created will be diminished in size. Furthermore, this image is termed "real" in view of the fact that light actually comes from it. Now, if the object were to be moved even closer, that is, nearer the lens than in the previous case but still farther than the point at which all the light rays traversing the lens converge, the image will be real and magnified. Lastly, if we locate our object still closer so that it lies inside the focus, that is, between the focus and the lens itself, the rays of light will appear to diverge from some point on the same side of the lens as the object. The image thus formed is magnified. It is also said to be "virtual" since light does not actually come from it but only appears to do so. In the first two cases the image is inverted. In the last mentioned case the image is erect.

The employment of the concave type of lens permits the production of only one kind of image. Regardless of where the

(Continued on page 60)

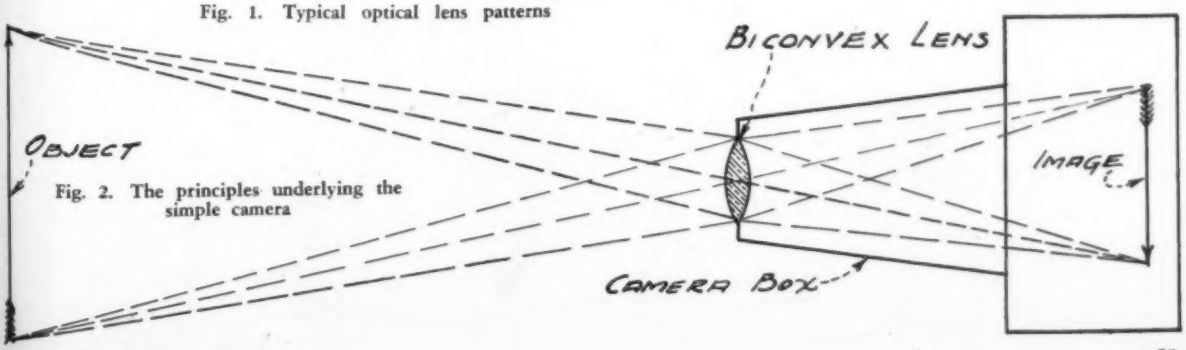
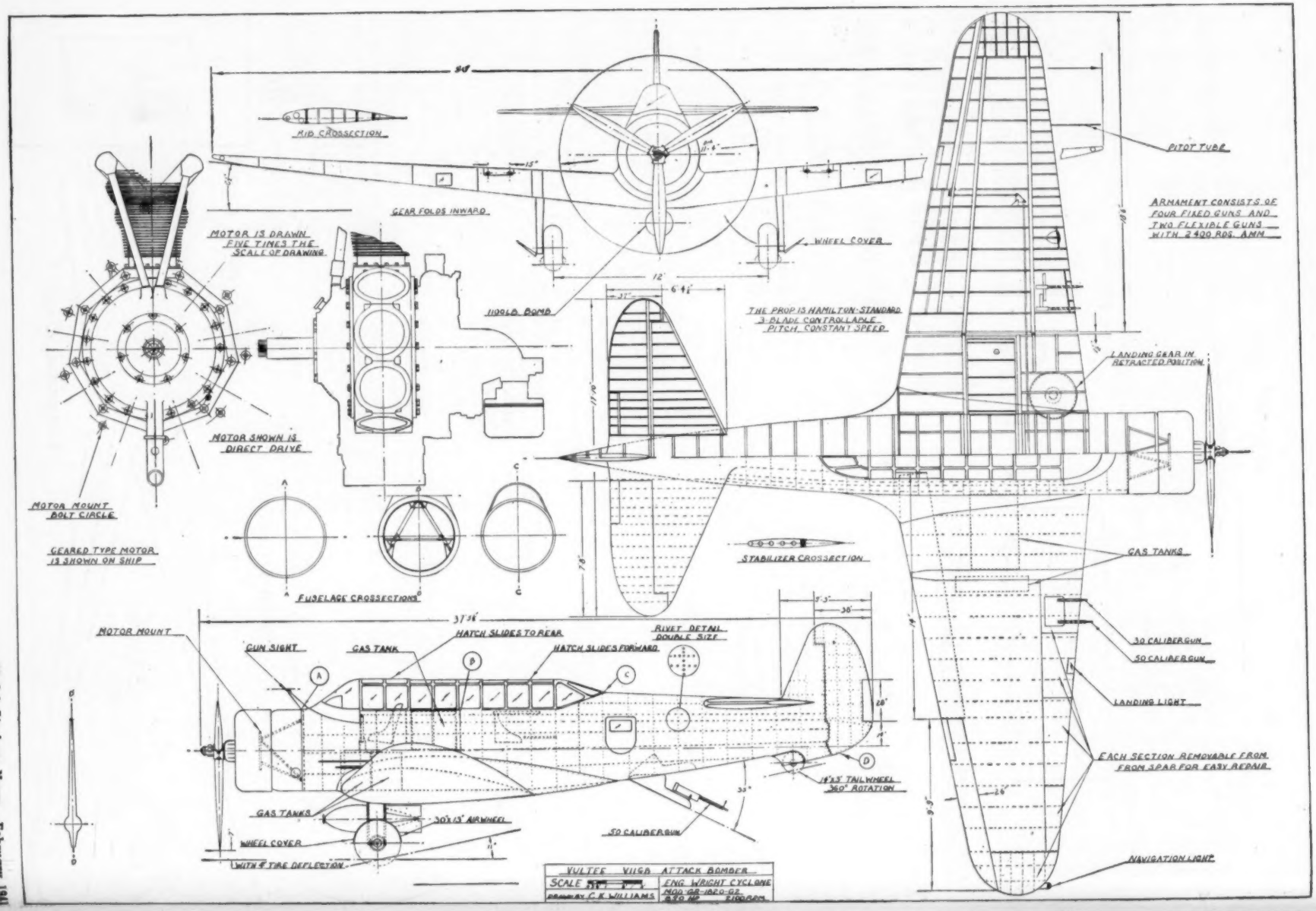


Fig. 2. The principles underlying the simple camera


MID CROSSECTION
GEAR FOLDS INWARD
MOTOR IS DRAWN FIVE TIMES THE SCALE OF DRAWING
1100 LB BOMB
WHEEL COVER
PITOT TUBE
ARMAMENT CONSISTS OF FOUR FIXED GUNS AND TWO FLEXIBLE GUNS WITH 2400 RDS. AMM.
THE PROP IS HAMILTON-STANDARD 3-BLADE CONTROLLABLE PITCH CONSTANT SPEED
LANDING GEAR IN RETRACTED POSITION
MOTOR SHOWN IS DIRECT DRIVE
MOTOR MOUNT BOLT CIRCLE
GEARED TYPE MOTOR IS SHOWN ON SHIP
FUSELAGE CROSSECTIONS
STABILIZER CROSSECTION
GAS TANKS
MOTOR MOUNT
GUN SIGHT
GAS TANK
HATCH SLIDES TO REAR
HATCH SLIDES FORWARD
RIVET DETAIL DOUBLE SIZE
30 CALIBER GUN
30 CALIBER GUN
LANDING LIGHT
EACH SECTION REMOVABLE FROM FROM SPAR FOR EASY REPAIR
18"x5" TAILWHEEL 360° ROTATION
GAS TANKS
30"x15" AIRWHEEL
WHEEL COVER
WITH 4" TIRE DEFLECTION
50 CALIBER GUN
NAVIGATION LIGHT
VULTEE VIIGA ATTACK BOMBER
SCALE
ENG. WRIGHT CYCLONE
R-1820-G2
DRAWN BY C.K. WILLIAMS

North American's new two-place light-attack bomber NA-69, with fully-retractable landing gear, now being turned out in quantity at Inglewood, Cal.

FLASH-NEWS

Special To Model Airplane News:

ARMY: The service-type Sperry bomb-sight has been sent to the Royal Air Force. A quantity of the sights, together with drawings and data for their production in England, has already arrived in London. Still a prize possession of the United States Army Air Corps is the new Norden bomb-sight with which the new Boeing and Consolidated bombers will be equipped. Also released to Britain is the air corps' magnesium flare used in the spectacular night photography tactics in which cities and areas may be photographed as brilliantly and as clear as in the daytime.

Forty-five old Consolidated PT-3A biplane trainers have been converted into tricycle types and equipped with radio control to be used as target planes for anti-aircraft training. Most of the ships have been sent to the Canal to perfect that vital zone's anti-aircraft defenses while others are being shipped to Hawaii, Puerto Rico and other coast artillery bases.

Parachute Troops of the 501st Parachute Battalion at Fort Benning, Georgia will be allotted "flying" time pay status, which amounts to about fifty percent more than a soldier's base pay.

Pilot Training has surpassed plane building, it was recently announced in Washington. Fledglings are being turned out at the rate of 12,000 a year while military airplane production now stands at only 15,000 planes a year, half of which are going to Britain in accordance with President Roosevelt's new "fifty-fifty rule of thumb" policy.

Continental Motors' new V-12 liquid-cooled engine developing 1,500 horsepower is due to replace the troublesome Allison models in new-type combat planes. Curtiss-Wright's St. Louis Division and the new Northrop firm at Downey, California are designing "flying wing" pursuit ships around this motor. In addition, David R. Davis has formed the Manta Aircraft Corp. in Los Angeles to produce his new sensational 600 m.p.h. single-seat pursuit, utilizing his famed Davis Wing airfoil and the Continental engine.

In the largest mass delivery flight yet made, thirty-three Vultee BT-13A basic trainers were flown from the Downey Field of the company to Moffett Field (formerly Sunnyvale), California. During the recent strike seventeen completed ships were flown away from the plant while surrounded by picket lines. C.I.O. officials state that North American Aviation is next on their strike list and that their wage-hour demands will be pursued throughout every aviation plant in the country in the order they have already selected.

An entire squadron has been transferred by air now that seven Douglas B-18A and twelve Douglas B-23 medium-bombers have moved the men, supplies and equipment of the 30th Bombardment Squadron from McChord Field, Tacoma, Washington to Santa Barbara (Calif.) Airport. The maneuvers, including gunnery and bombing, will continue for ten days after which the entire squadron will be flown back to the Washington field.

NAVY: First production model of the giant Consolidated XPB2Y-1 four-motored patrol-bomber has been delivered to the 13th Patrol Squadron at North Island Naval Air Station, San Diego, California. Five more will follow immediately upon completion. Modifications include two power-driven turrets of Consolidated design. Cost: $300,000 each!

Possibility that a new dirigible base would be constructed in New England came recently when Captain C. E. Rosendahl inspected a 400-acre site offered to the navy in the Boston area. This news comes on the heels of a naval order to the Goodyear Aircraft Corporation of Akron (Ohio) for six non-rigid blimps at a cost of $1,324,000.

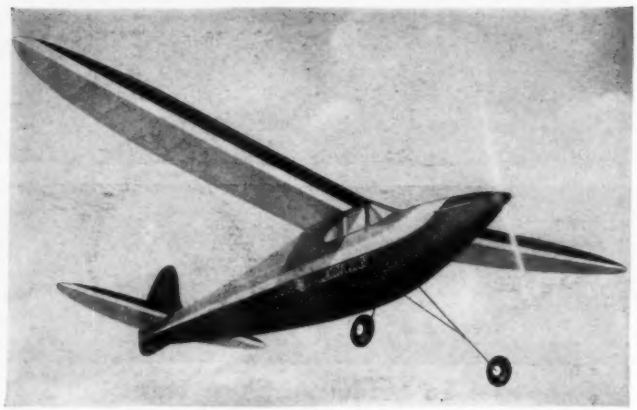
Third Pacific Coast base of the United States Coast Guard Air Service was opened recently at the San Francisco airport. The new giant Consolidated PBY-5 flying boat, equipped with two large rear gun-turrets and recently delivered to the U.S. Coast Guard, will be based there.

Three of Britains eight navy bases traded to the U.S. for the fifty destroyers are now in use by naval aviation. Consolidated PBY flying boats are now flying neutrality patrol from bases at Bermuda, St. Lucia and Trinidad. More than twenty million dollars has been awarded the

(Continued on page 65)

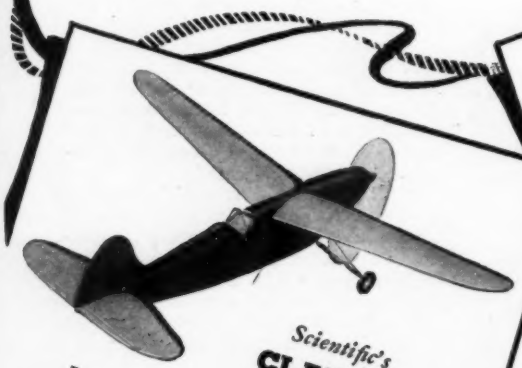
It's A 4★ "Hit"! Scientific's

ALL AMERICAN



Boost America! Build this patriot of the air! Enjoy flights such as you have never experienced before! Designed to fly, the "ALL AMERICAN" has consistently made long, graceful endurance flights of two miles and more! Its dashing, patriotic color scheme of red, white and blue will capture the heart of every patriotic young American.

45" Wingspan. Complete Kit, including detailed, full-size plan, postpaid or at your dealer..... **$1.00**



Scientific's
CLARION

A scale type model, designed primarily for flying. Wing is stationary and faired into the fuselage. Tail surfaces are designed with movable tabs insuring easy directional control. Yellow wings, blue and black stabilizer, blue fuselage and rudder. 30" Wingspan. Complete Kit postpaid or at your dealer..... **50c**

Scientific's **BULLET**

The fastest thing on wings! A pursuit type plane with a low, streamlined, tapered wing; movable tabs on tail surfaces; single strut landing gear; easily constructed enclosed cabin (including instrument panel). 30" Wingspan. Complete Kit postpaid or at your dealer..... **50c**

SCIENTIFIC

...for up-to-the-minute design
...for top speed and endurance
...for all-around action

Get your copy of Scientific's 1941
CATALOG
Send 5

Scientific's Class "C"
MERCURY

Has many distinctive features you would expect to find only in planes costing at much higher prices. Complete kit weighing only 2¾ pounds ready to fly, yet by applying regular model construction it is as strong as models weighing 4 to 5 pounds. Complete Kit postpaid or at your dealer (less motor) .....

Double Edge Blades Package of 2...

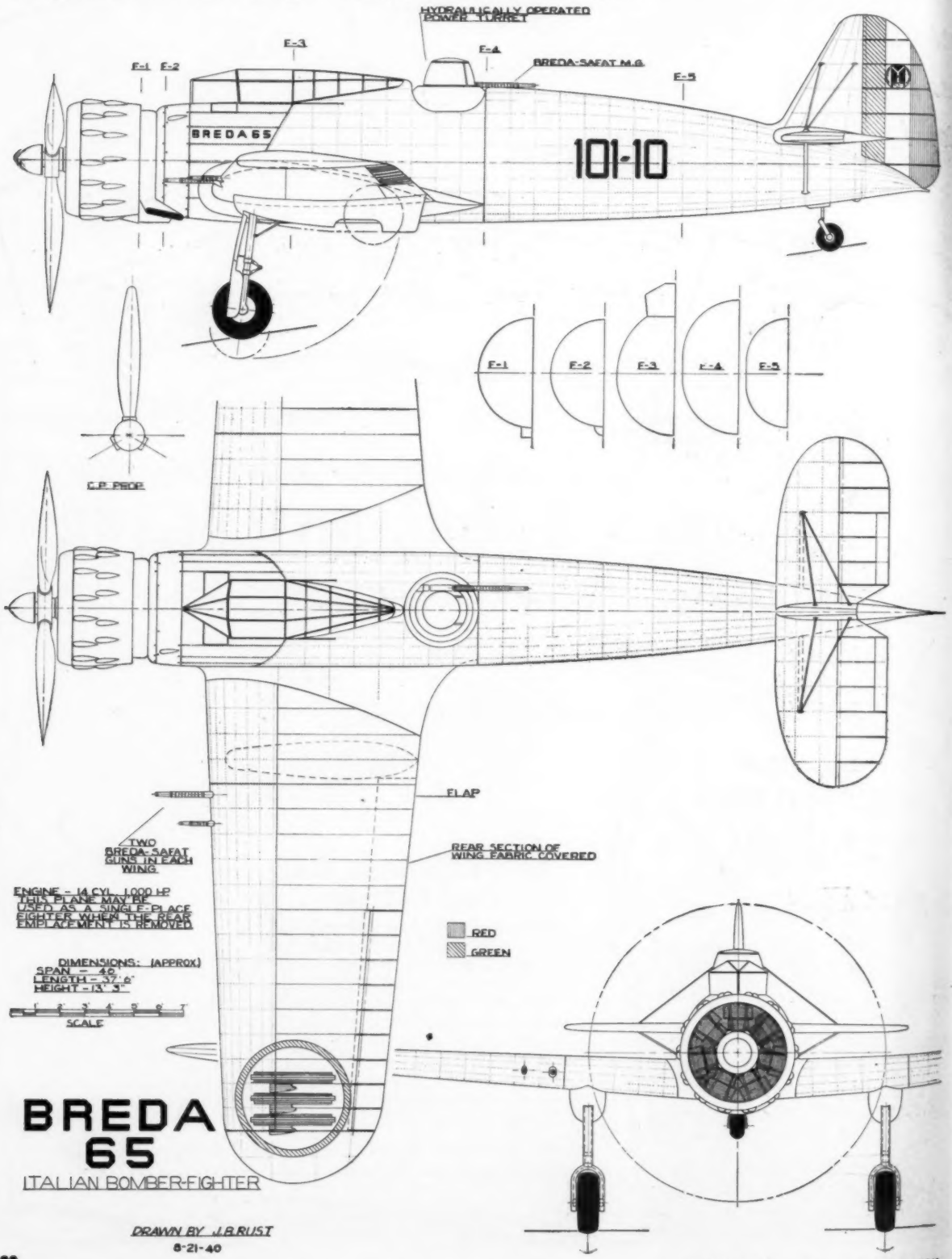
SCIENTIFIC MODEL AIRPLANE CO

"GAS MODEL HEADQUARTERS"

218-220 MA-2 MARKET ST., NEWARK,

THE BREDA "65"—ITALIAN BOMBER-FIGHTER

ONE of the planes used in the African campaign against the British. It is used as a single-seat fighter without the rear gun turret which carries one gun. Two guns are carried in each wing. With a 1000 hp. engine the maximum speed is 267 m.p.h. As a fighter-bomber it is manned by two men. Though its speed is not high, it is a sturdy dependable craft, but apparently no match for British Spitfires.



Megow's KORDA MODEL

World's Record
43 Minutes, 29 Seconds

$1.00
(By mail, postage 10c extra)

Celebrated Wakefield International Championship Winner

If you, too, want to be a winner, start with the kit that has everything it took to win the championship . . . all the principles and specially selected materials. Improve upon some small detail and maybe you can beat the present record.

This kit, one of the most popular ever produced by Megow, contains Korda's original and official plans and specifications. Conforms exactly to contest requirements. Extremely light and rugged construction. Every piece of material selected with the greatest care. Polyhedral wings. Single blade folding propeller. Wingspan 44 in. Wing area 200 sq. in. Weight 8 oz. Stabilizer span 21 in. Kit contains all materials except rubber which should be bought fresh from your dealer when ready to use.

New MEGOW "199" MOTOR

Operates upright or inverted. Chrome-vanadium steel cylinder honed and lapped to .0001". Timer enclosed. Crank case special aluminum alloy, permanently sealed. Extra long bronze bearing. Tungsten points. Bore and stroke, ⅜". Disp. .199. Weight 3½ oz. Block tested.

$12.50 *with coil and condenser*

Aero-Champ 95c

E21 Gas Model (Kit only. Less Wheels & Prop.)

Designed especially to take the "199" motor shown here. A brand new type gas model, practical and easy to build. Small, light and sturdy for safe landings. Wingspan 46 in. Flying weight 16 oz.

Complete with "199" Motor, Megow Sponge Wheels, Rite-Pitch Propeller and Flight Timer. **$14.95**

D9 RYAN ST.

50" span model of popular in-line engine, tandem sport trainer used by U.S. Army. Complete with plans and materials.

$1.50
(By mail, post. 15c ea.)

Exclusive Distributors RITE-PITCH PROPELLERS

D11 AIRACOBRA

37" span model of 500-mile-per-hour interceptor pursuit plane. Tricycle landing gear, 3-blade semi-carved propeller, full-color insignia, colored dope, plans and all necessary materials.

$1.00
(By mail, post. 15c ea.)

D10 GULFHAWK, JR.

17-in. model of Al Williams' latest. A Stinson 105. Colors orange and white. Complete with plans and all materials.

$1.50
(By mail, post 15c ea.)

J17 "STUKA" BOMBER

30-in. span rubber-powered model of the German Junkers Dive Bomber JU 87B. All materials and plans.

50c
(By mail, post. 10c ea.)

25c
(By mail, post. 10c ea.)

C31 SPITFIRE

Favorite fighter of the British R.A.F. A flying model that's a little beauty. 23-in. span.

HO and O GAUGE RAILROADS

Exact scale, highly detailed cars and locomotives. Flexible Roadbed, Track Sections, Stations, Towers, etc. New needle-bearing HO trucks with brass insulated wheels, **25c**

MODEL SHIPS

Scores of historic and romantic ship models, many with carved hulls. Ready-made parts and supplies.

Megow

HOWARD & OXFORD STS. PHILADELPHIA, PA.

217 N. Desplaines St., Chicago, Ill. • 718 Mission St., San Francisco, Cal.

DEPT. MA.

MAIL THIS COUPON

with 10c postage for big, new 132-page Catalog, or enclose with money order or check for ordering above items by mail. Check items wanted.

- ☐ "199" Motor
- ☐ E21 Aero-Champ Kit
- ☐ Aero-Champ complete
- ☐ D9 Ryan ST.
- ☐ D11 Airacobra
- ☐ D10 Gulfhawk, Jr.
- ☐ J17 Stuka Bomber
- ☐ C31 Spitfire
- ☐ CATALOG

Money Order for $_____ is enclosed.

Name _____

Address _____ State _____

City _____

Flying Men and Flying Models

(Continued from page 9)

opportunity to observe first hand just how our air corps is progressing in the national defense program, it is gratifying to report that American initiative is still very much in evidence, and what's more, it is encouraged. Instructors don't take any back talk, to be sure, but they engage in intelligent discussion of the problems of flight with their students, rather than resort to a dogmatic shouting of instructions into a cadet's ear, as though it were the microphone through which controlling impulses guided the reactions of a robot. Finally, as a model builder, we made it a sort of hobby to see how other model builders fared as cadets, and to observe in what ways a knowledge of models has definitely contributed to an ability to pass the courses offered.

While lecturing about the strength of vertical currents in the atmosphere a cadet raised his hand in question.

"Do the compensating currents for these risers appear immediately outside the cloud?" he asked.

"Risers!" We hadn't used that word, but it is familiar to every model builder who has longingly searched the sky for some indication as to when would be an opportune time to release that contest model.

His question was answered and thereafter his progress was watched. When he completed the primary course, he stood well up in the first ten cadets in the ground school and had completed the flight course without the necessity for any checks other than the regular progress checks. Further, he was not a college graduate, but had the two years college training which is all that is required as a minimum qualification for entrance into the training program.

Before he left for Randolph and basic training, his expressed reactions and opinions so closely corresponded with other modelers that they are passed along as evidence of the excellent use to which he put his model knowledge. Oh yes! Of course he was a modeler—had been for a long time, and as soon as he finished his training was planning to build flying models of the very ships he had trained in. Naturally, he couldn't do it during training; a cadet's time is pretty well taken up with the work in hand. But after primary and basic training, advanced training in military flight is given with the tactical units to which the cadet is assigned; then they have a little more time for relaxation and hobbies.

He said that in the actual flight training his model experience helped him to recognize certain factors sooner than he would have otherwise. He ruefully admitted, however, that cognizance of an attitude didn't always help him correct it! In this phase of the training, the model experience had its minimum importance. You can, of course, realize this when you consider that the appearance of a maneuver from the ground is entirely different from the view that the pilot gets.

It was in the ground school that he found his model experience to be an excellent foundation. Let's see in what way, separately considering each course:

In the Engines Course the experience with gas models had assisted in understanding the importance of timing, mixtures, carburetion and other fundamental theory, even if some of the more complicated elements were unfamiliar. At least he knew the difference between a flooded engine and a floating engine mount. Some of the cadets had trouble telling the difference between two cycle, four cycle, and bicycle! Before the course, but not afterwards. As he put it, a little head start is better than none.

In Airplane Structures model experience was of immeasurable aid. When you stop to consider that there are people in this country who don't know the difference between a spar and a longeron, and that they apply for this training, you can see how many things they must learn; to an old model builder the terminology of aircraft structures is part of his stock in trade. Furthermore, the necessity for extra bracing at certain points, such as the landing gear fittings, is too well known to modelers to even need mentioning. And rigging? Too many models have crashed due to faulty rigging, and the difference between correct and incorrect setting is the difference between flight and failure.

Theory of Flight? Ah-h! Here is where the modeler will always thank his lucky stars. Theory of fright! That's what most of the cadets call it. Lift, drag, airfoils, flaps, parasite and induced drag—think what a boon it would be to know why wingtip stall can be counteracted by using wash-out. And if you don't know all of these things, there's another use of the word "wash-out," and that's what the cadet will be if he doesn't grasp these facts. (A "wash-out" is a cadet who fails to make the grade and is dismissed. The board which meets to consider a possible wash-out's case is called the "washboard.") It is in the course on Theory of Flight, which is one of the toughest of the ground school courses, that modeling experience shows up to greatest advantage.

Of course, in Navigation and Maps, model work is of little assistance, although some of those ardent modelers at the Nationals became expert in the use of maps to locate the field, hotel and various other points. Also, cross-country running might be mentioned; some of the boys almost needed flight plans in order to follow their ships!

In the course in Meteorology, the cadet found that the assistance offered through model experience depends upon the individual. Some modelers pay little attention to the weather other than to "gripe" when it rains and they want to test their new creation; other modelers pay serious attention to the weather and study it with the idea in mind that everything counts in a championship flight. Why is it that most of the championship flights in any meet are made between eleven in the morning and four in the afternoon? Risers! Yes, but where do they come from, and where do they go? The serious modeler investigates those things, and when he does, the first thing you know, he's getting a pretty good foundation in meteorology.

So there we have it. You, no doubt,

Contest Records

Start HERE

The man you see above is Thomas Horton. He is 45 years old, has been a highly skilled machinist for 25 years, and has been working on Junior Motors cylinders for 5 years.

The machine he is operating is a universal cylindrical grinder. In the machine is a Brownie cylinder. Mr. Horton is grinding the outside diameter of the cylinder concentrically with the inside piston bore. This grinding operation is performed to an accuracy of .0002 of an inch. If you could split a human hair thirty times, you would be playing around with the same figure.

You can bet Mr. Horton knows what he is doing. And if your next motor is a Brownie or a Model D, we can say the same for you.

See your nearest dealer.

Brownie Model E. The most powerful motor in "B" class A.M.A. rules, with a cubic inch displacement of .29 out of a .30 limit for "B" class competition. Factory tested, complete with coil, condenser, and Champion Spark Plug. **Price, $7.50**

Model D. The Choice of Champions—smooth, roaring powerful action that masters the air with delightful ease. Over 50,000 now in use in model planes, boats and cars. Factory tested and fully guaranteed. **Price, $12.50**

Junior Motors Corporation

PHILADELPHIA

have heard that modeling helps flying, but now you can see where it helps most, and in what way. There are many angles to flying besides the actual manipulation of the controls, and the airman who knows what happens when certain influences are brought to bear will certainly be better off than the one who only knows the result. When disaster occurs the result is obvious. But to discover the reason behind, and to determine methods of preventing recurrence—those are the really important factors. The earlier we begin our study of fundamental theory, the more time we will have later on to study advanced phases.

If you want to fly, but there is some reason why it must be postponed, you will do well to make airplane models your hobby, or if, as is the case with so many of you, you already are a model builder—go a little further. Find out why risers are most frequent in the early afternoon; find out why cantilever wings are used sometimes, and strut braced wings at other times. And why do some models stall and spin, others spiral in under full power, still others fly beautifully?

If you want to be a flying man, fly models!

Academy of Model Aeronautics

(Continued from page 19)

street cars, subways, elevateds, taxis, escalators, elevators, and bicycles. Not included was hitch-hiking and submarine travel.

As part of this, the year-old automobile operated by A.M.A. Executive Director Al Lewis has gone more than 25,000 miles—mostly in the pursuit of aero-modeling activities.

Another Model Builder Makes Good

Harry S. Pack, Jr., is one of the model builders who has made good in a big way. Pack's association with the aviation industry dates back to his model building days which later resulted in the formation of a company devoted to the manufacture of models and kits. Joining Sikorsky Aircraft Corporation subsequently, Pack worked in the shop and sales engineering department; then became associated with an industrial engineer engaged in aircraft designs.

His next association was with American Airlines and about four years ago he started an industrial design business at Grosse Pointe, Michigan. Pack's organization has designed buses, automobiles, radios, and other items; and has styled the 1940 Piper Coupe, the Luscombe "Silvaire" and is now working on the Spencer-Larsen amphibian. He is retained both by American Airlines and Penn-Central Airlines for their various styling problems.

Modelers Do Their Bit for National Defense

Six members of the Fall River (Mass.) Model Engineers, a chapter of the Academy, are doing their share in the National Defense Program, according to John Anderson, Jr., the club's president. Three members of this small club are now serving with the National Guard, two with the Army, and one with the Navy.

This is an interesting comparison with a Kansas City Academy Chapter which folded up when all members got jobs in the aviation industry.

Metropolitan Council Chartered

The first metropolitan model airplane council to be recognized by the Academy has just been chartered in Milwaukee. Composed of businessmen and civic leaders, the Milwaukee Model Aviation Council is headed by Howard W. Carlson, who is also president of the Milwaukee Gas Model Club.

The Council is expecting to set up model airplane classes, as well as a novice model club. Another objective is to find suitable model flying fields near the city, which would be accessible to all the flyers.

Model aviation in Milwaukee received a real boost recently when the city's Propeller Club had 500 youngsters at a learn-about-model-airplanes gathering.

Headquarters Notes

The Virginia Model Association, an affiliate of the Academy of Model Aeronautics, announced its first annual planning conference at Hampton, Va., on December 14. Sanctioned indoor records trials were held under the direction of contest director C. Norman Purdy, Charles (Tom) Hulcher, and Herb Weiss.

The gathering was a three-in-one affair and included the contest as well as a banquet and conference.

* * *

Every leader member of the Academy and the officers of each Academy chapter are invited to submit in writing to the Contest Board of the A.M.A. any proposals they, or the model builders in their vicinity, may have regarding 1941 regulations governing the flying of model aircraft and official contest procedure.

It is recommended that each club call a meeting for the purpose of discussing the existing regulations as well as future rules and make a report which will represent a consensus of opinion of the members of every club.

Academy Issues New Club Manual

As its latest contribution to the advancement of model aviation, the Academy of Model Aeronautics announces publication of its new official *Chapter Manual*. This follows closely upon the heels of the Academy *Contest Manual* which was issued recently and has received high praise.

The Chapter Handbook gives complete directions for the establishment of a model airplane club. Various organizational steps are detailed and suggested by-laws are offered. A complete outline of program activity covers educational and recreational projects and includes all types of ceremonies in which model groups can participate.

This is the first time complete details on successful existing organizations have been made available to those desiring to engage in junior aeronautic club work. The material in the A.M.A. manual was designed to be of special value to recreation leaders, club sponsors, model airplane leaders—in fact, to everyone interested in the establishment and maintenance of a successful aero-modeling organization.

A feature of the handbook is an entire section devoted to sources of program material. This includes the "Where Book of Program Material" developed by N.A.A.

and originally obtainable for 50c. To this has been added listings of motion pictures suitable for model clubs, as well as names of lecturers and aeronautical pamphlets and printed material.

The Academy's Club Manual is available postpaid for 50c. Inquiries and remittances should be addressed to the Academy of Model Aeronautics, Willard Hotel, Washington, D.C.

Frontiers

(Continued from page 17)

the enemy pursuit pilot is certainly going to have his troubles "drawing the bead" on a "Boston." Even Douglas's experimental DB-7 with twin-ruddered tail has now been doused in camouflage with English insignia which, no doubt, signifies that that model has also been accepted.

The first of Lockheed's twin-engined interceptors are now to be seen in the skies occasionally; and if anything exemplifies speed, it is the Lockheed. Most of our fast airplanes, such as our 200 m.p.h. transports, do not appear to be going as fast as they actually are when they are high in the air, but high or low the Lockheeds definitely portray their sleekness. They are also quiet airplanes and should thus have an uncanny ability of surprising the enemy. Great Britain is planning to use Rolls-Royce engines in some of the interceptors.

Lockheed Interceptor Pursuit

This plane is designated by Lockheed Aircraft Corp. of Burbank, Calif. as Model 322-61, and as such it has been sold abroad. The performance figures are conservative and are what the airplane can do in still air. However, with the help of tail winds (and the press) higher speeds can be obtained.

Specifications: Flight station for one pilot—Height 72.2 in.; Width 38 in. Armament compartment is in the nose of the fuselage with provisions for four machine guns (two caliber .50 Colt MG-53 with 400 rounds of ammunition, and two caliber .30 Colt MG-40 with 1,000 rounds of ammunition) and one aircraft cannon (23 mm. Madsen with 50 rounds of ammunition). Alternate armament arrangement available. Oxygen provisions for pilot. Length overall—37 ft. 10 in.; Wing area—327.5 sq. ft.; Standard useful load—2,329 lb.; Standard gross weight—13,500 lb.; Height overall—9 ft. 10 in.; Weight empty—11,171 lb.; Overload useful load—3,177 lb.; Overload gross weight—14,348 lb.

Type: Two-engine, all-metal single-place, multi-gun, mid-wing, cantilever, land monoplane designed for the interception and attack of hostile aircraft.

Performance: With Allison V-1710-C15 engines: High Speed at 16,000 ft. with 1090 hp.—404 m.p.h. High Speed at 5,000 ft. with 1090 hp.—361 m.p.h. Time to Climb to 16,000 ft.—5.6 min. Endurance at Full Throttle, at 16,000 ft. with normal fuel of 230 gal.—1 hour. Endurance at 350 m.p.h. at 16,000 ft. with 230 gal.—1.8 hr. Range at 350 m.p.h., normal fuel—600 miles. Range at 350 m.p.h. with fuel overload of 360 gal.—1,070 miles. Take-off and landing characteristics to clear and land over 50 foot obstacle—within 2200 ft. Absolute Ceiling—30,000 ft.

Engines: Two 12 cylinder Allison V-1710-C15, 60 deg. "V" type, liquid-cooled. Normal Power—960 bhp. at 12,000 ft. Military Power—1090 bhp. at 13,200 ft. Hamilton-Standard counter-rotating, quick-feathering propellers. Max. Fuel Capacity—410 U.S. Gal. Normal Fuel Capacity—230 U.S. Gal. Max. Oil Cap.—26 U.S. Gal. Norm. Oil Cap.—17 U.S. Gal.

Construction: Wing:—All-metal, stressed skin, full cantilever, single spar. Three panels, center section with integral fuel tanks and rearward booms, and two removable outer panels. Flaps:—Four Lockheed-Fowler hydraulically operated—2 in center section and one in each outer panel. Ailerons:—Differential with flush, anti-icing hinges, dynamically and statically balanced. Fuselage: All-metal, stressed skin, semi-monocoque. Tail Booms: All-metal, full cantilever, consisting of 1 elevator, 1 stabilizer, 2 rudders and 2 fins. Landing Gear: Tricycle type (retractable) with swiveling nose wheel and brakes on main wheels, trend 16 ft. 6 in. Pneumatic shock absorbers.

While Boeing is making delivery of its third innovation of the "Flying Fortress," the B-17C, Consolidated has been getting her four-engined bombers into the air in rapid succession. The first for Great Britain has already run through its tests and it makes the biggest airplane-camouflage project now going on in this country. We notice a redesign of the vertical tail surfaces which, of course, is far from out-of-the-ordinary on a new American airplane. If there has been an epidemic in the industry, it has been the changing of rudder designs. Even Curtiss-Wright's twin-engined Model 20 transport is now parading around with a single rudder of huge area to do the duties of the two smaller ones originally used. It appears that, with so many new airplanes undergoing tail rejuvenation, there is still a lot to learn in tail surface design. It is not so much a problem of determining the proper amount of tail surface area as it is of placing that area in the position on the airplane where it will be most effective; the most important being that it will not be blanketed out by the stabilizer in a spin. A long fuselage always helps, too. The reason the Boeing "Flying Fortresses" are able to go about the world with only one rudder is that they have a long fuselage which forms a long moment arm. It is said that one of these planes was accidentally put into a spin of vigorous nature and successfully survived the ordeal. One of the crew apparently did not have the faith in the Boeing that the others had, for he left the four-engined bomber by way of the nose gun turret, making full use of his parachute on the way down.

However the American aeronautical engineer has mastered the design of the airplane and can rely on a plane performing as well as it was calculated on paper. That is why the new planes for Great Britain can be produced in such short order. That is why several contracts of late have been completed well ahead of schedule. The manufacturers and designers should not be patted on the back too

The Nation Writes

DICK KORDA writes:

"To say that I'm pleased with your motor is putting it mild . . . As for flying, that isn't the word for it, it pulled my ship absolutely straight up . . . and I have plenty of witness to this, including the amazed owners of other ships."

CARL GOLDBERG writes:

". . . on the thrustometer . . . it outpulls the Old Atom motor by a considerable amount. The anti-flood characteristics of the motor are simply excellent."

W. D. C. Jr. (Dealer)

"The performance of the 1941 ATOM is astounding; surpasses everything in its class and anything around it. Starting perfect in all kinds of weather."

B. G.

". . . all I have to do to get the motor started is to flip it over once or twice. Considering the cost, power, weight and quality of your engine, I believe you have the best 'A' motor on the market."

C. K.

"My ATOM is really supreme to other class 'A' engines. It pulls my 16 oz. job straight up and starts immediately upon a prime."

much, however; as they, themselves, are somewhat surprised at the progress that has been made.

To speed production one manufacturer, Glenn L. Martin, has been experimenting with plastics and is making the bomb-bay doors and smaller items, such as trim tabs, of Bakelite composition. These are features of the new Martin "Baltimore" light bomber, the first of which has gone through its test flights for Great Britain. Camouflaged, this plane resembles those sent over to France by Martin. The Martin B-26 for the U. S. Air Corps is also under test. . . . And another ship to pass test flights for Great Britain, Vance Breese at the controls, is the North American NA-73 interceptor-pursuit. The NA-73 has a retractable oil cooler with an air tunnel large enough for a man to lie down inside, like crawling through a sewer pipe. Engine trouble caused the plane to make a very damaging forced landing when well in the course of test flights.

The time has passed now when one could designate the specific types of airplanes that would go to Great Britain, because that country has now placed orders for practically every type of airplane we build. In other words, whatever the U.S. Air Corps buys, so will Great Britain. When looking over the various types and sizes of aircraft now abuilding, the big problem appears to be who is to fly which, when and where? In some certain instances the R.A.F. has placed special orders for new equipment which the U.S. Air Corps has yet to consider. One of these is the order amounting to $17,000,000 awarded to Northrop for heavy dive-bombers similar to those originally ordered by Norway. . . . And when all these fighting planes are rolled into use, that little man with the black mustache is really going to have his troubles.

The American planes will, of course, augment what is already a fine fighting power, the Royal Air Force. Below is tabulated what the boys were doing in the early Autumn of 1940 when the Blitzkrieg did not live up to advance notices. The following figures prove the superior design of English planes over the Germans' as well as the ability of the R.A.F. pilots.

Date	German Planes Downed	English Planes Downed	Pilots Safe
Aug. 8	61	18	3
Aug. 9	1	0	0
Aug. 10	1	1	0
Aug. 11	65	26	2
Aug. 12	62	13	1
Aug. 13	78	13	10
Aug. 14	31	7	2
Aug. 15	180	34	8
Aug. 16	75	22	14
Aug. 17	0	0	0
Aug. 18	152	22	12
Aug. 19	5	3	2
Aug. 20	0	0	0
Aug. 21	13	1	1
Aug. 22	10	2	1
Aug. 24	50	0	0
Aug. 31	88	27	11
Sept. 1	25	15	6
Sept. 2	55	20	8
Sept. 3	25	15	7
Sept. 4	54	17	5
Sept. 5	39	20	11
Sept. 6	34	9	3
Sept. 7	103	22	13
Sept. 8	11	3	2
Sept. 9	52	13	7
Sept. 10	2	0	0
Sept. 11	89	24	17
Sept. 12	3	0	0
Sept. 13	2	0	0
Sept. 14	18	9	3
Sept. 15	185	25	11
Sept. 16	7	0	0
Sept. 17	12	3	1
Sept. 18	48	12	3
Sept. 19	5	0	0
Sept. 20	5	7	4
Sept. 21	2	0	0
Sept. 22	1	11	3
Sept. 23	13	11	3
Sept. 24	8	4	1
Sept. 25	27	4	5
Sept. 26	34	8	3
Sept. 27	133	34	16
Sept. 28	6	7	7
Sept. 29	10	4	2
Sept. 30	49	22	10
Oct. 1	5	3	3
Oct. 2	13	0	0
Oct. 3	1	0	0
Oct. 4	3	1	1
Oct. 5	23	9	2
Oct. 6	3	0	0
Oct. 7	28	16	6
Oct. 8	8	2	2
Oct. 9	4	1	0
Oct. 10	7	5	3
Oct. 11	8	9	3
Oct. 12	11	10	4
Oct. 13	2	2	0
Oct. 14	0	0	0
Oct. 15	18	15	6
Oct. 16	6	0	0
Oct. 17	4	3	3
Oct. 18	0	0	0
Oct. 19	2	0	0

The above figures show that the Germans are really taking a trimming and proves that the design of an airplane superior to that of the enemy is more important than the quantity produced. Another interesting item is that only four Lockheed Hudsons out of the several hundred that have already been sent to Great Britain have been lost by ships sunk on the way across the Atlantic Ocean. The new bomber that Lockheed is now building for Great Britain is well in the course of construction and will tote two 1750 hp. engines.

The multi-place fighter may see action in Europe sooner or later, mostly later, and when it does, its potentialities are manifold. In the present war the twin-engined Messerschmitt "110" comes closest to being a multi-place fighter, but its fighting characteristics, what it has of them, leans more to the pursuit style. Most of the dog-fights have been staged by single-engined interceptor pursuits, and as far as the Germans are concerned they have not been a potent enough weapon for on nearly every occasion the English have broken through the attacking German's pursuit defense to "bag" a considerable number of bombers. The Bell Aircraft Corporation is the originator of the modern multi-place fighter and is the only manufacturer of such a type in

QUALITY IN THE BALANCE

TIGER AERO

TIGER AERO
$16.50

• The Tiger is unequaled among model engines in the number and quality of construction features. In seeking technical perfection nothing is spared to gain performance. Horsepower per cubic inch is pushed higher and higher.

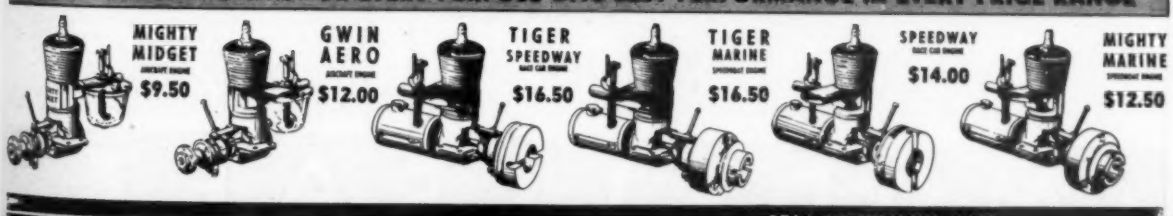
Extra power puts the Tiger in an unassailable position as a contest engine. Its tremendous popularity proves model fliers will pay for added quality. Qualities that actually do make models fly higher, further, longer and more reliably.

In size the Tiger is in the middle of class C. This optimum size engine is assured lasting compression by the use of *both* lapped-in piston plus piston rings. So advanced is this development that you are urged to use a power-yielding, Ethyl gasoline-Castor Oil fuel mixture. No other manufacturer has made this recommendation for a model aircraft engine.

More power and speed, real aerobatics for new U-CONTROL gas models with TIGER

With a Tiger for power you will be amazed at the stunts, loops, zooms, power dives and speed aerobatics you can do with the new type gas models controlled from the ground. Jim Walker's 36 inch "Fireball" mounts a Tiger without alteration. Compact design of Tiger crankcase is no larger than small class B motor. Tests show easier, positive elevator control with increased Tiger power.

THESE BUNCH MOTORS FOR EVERY PURPOSE GIVE BEST PERFORMANCE IN EVERY PRICE RANGE



BUNCH MOTOR COMPANY 6714 McKINLEY AVE., LOS ANGELES, CALIFORNIA

Modelcraft War Planes

are selling like ice water in a cloak room in Hades. Have you got yours yet? See them at your dealer's now. These solid scale models have complete die-cast parts, shaped fuselage and wings, correct color insignia, and best of all, the price is just two bits apiece. Anybody feeling ambitious can order the whole set and still not drain the treasury.

Barney

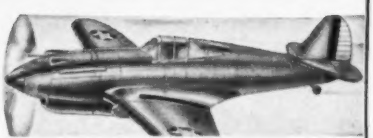
only

25¢ EACH

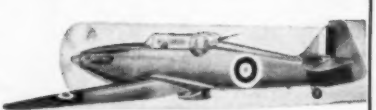
Add 10c postage. On orders for set of six—add only 20c postage—or total of $1.70.

DEALERS: Are you featuring these truly superior popular-priced models or letting modelers order direct from us because they don't see them in your store? Individual 3 color boxes with picture of model contained in each.

BELL AIRACOBRA **CURTISS P-40**



SUPERMARINE-SPITFIRE • BOULTON PAUL "DEFIANT"



STUKA DIVE BOMBER **MESSERSCHMITT**

SUPER SNOOPER

(Rubber Power Sensation)

No picture we have been able to get so far does justice to the Super Snooper. It has wing area of 205 sq. in. and complies with Wakefield requirements. All features are modern—dihedral stabilizer, twin rudders, and polyhedral wing. Performance from initial test flight has been sensational. 7 miles is not unusual. Worth every bit of the buck and a half it costs, the Super Snooper is NOT cheapened in any place and kit is COMPLETE with plenty of dope, special outdoor paper, 45 ft. rubber, one bladed-folding prop, etc., etc.

$1.50

MOTORS-OF-THE-MONTH

NEW POLICY. Hereafter, instead of listing a full line of motors, we will feature and describe just two makes of engines per month, giving our personal recommendations and opinions of each. We do not make engines and have no personal axe to grind.

BROWN JUNIOR ENGINES

Junior Motors Corporation

Brown Junior Motors—B-C-D-M—have the right power output for the widest range of Class C planes. Some of the earliest Browns—Nos. 1 to 25—are still in use, which says all that needs to be said about Brown quality and dependability. Steadily improved each year, the new Browns are the finest ever built by Junior Motors and **show off to their best advantage in a Spook 72.**

For Class B—Brownie, which is NOW IN STOCK, makes an excellent low-priced engine and can be operated very successfully with Spook 49, Miss Tiny, or Sky Baby when fitted with a 10" D-G prop.

Model D—$12.50 **B—$21.50**
C—$18.50 **M—$16.50**
Brownie—$7.50

The New ATOM

Microdyne Engines, Inc.

Great increase in power is now offered by the new Atom, which is the lightest production engine on the market, weighing only 1¾ oz. With a displacement of only .097 cu. in. the Atom nevertheless stands a very good chance of copping top honors in Class A contests, and its good engineering design and precision manufacturing make this flyweight a sound investment for those interested in a very light motor.

NEW ATOM—$15.50

IN STOCK—OHLSSON, DENNYMITE, OK, SKY CHIEF, MADEWELL, BANTAM, FORSTER 29, and the new Syncro P-C 2 Motor Kit, Class B $3.95 (Surprise—the darn thing runs! It's all right and can be put together in 15 mins. with 4 screws). Also the new Syncro Class B-30—$6.95. Order from Modelcraft and be assured of prompt delivery and dependable merchandise.

★ MODELCRAFT ★

LARGEST SUPPLY HOUSE IN THE WEST ★ 7306 SOUTH VERMONT AVENUE, LOS ANGELES, CALIF.

"SPOOK"

FASTER CLIMB! LOWER SINKING SPEED!

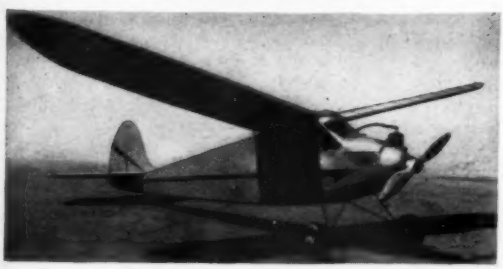
Weight 3 lbs. (wing area being really piled on this one), yet ship has a strength factor of a five pound airplane. See the Spook 72 at your dealer's now or order direct. Kit has everything necessary to build the model. **$3.95**
Plans only, **50c**

"72" Taking off in a blaze of speed, this high performance contest ship comes out in a long flat glide, and practically glues itself to any thermals that may be available. It also has an extremely low sinking speed, and is probably the easiest model for a beginner to use in getting into Class C, due to its stability. The gull-wing design is just as easy to build as a dihedral splice on any wing, and not as difficult as a polyhedral. Spook 72 can be powered with any Class C engine you have or intend to get.

"48" Spook 48 "went to town" last fall in both Class A and B and will be one of the outstanding contest ships of the coming season. Just took first place, Woman's Division, Southern California Gas Model Contest, Wilmington, Calif., flown by Eunice Erven. Very fast when powered with Ohlsson 19, or Bantam, it gives **rocket performance** with Ohlsson 23, Hi-Speed, Brownie, or other good Class B engine. The gull-wing design also assures maximum stability and soarability, **with an extremely low sinking speed.** Kit contains cement, dope, covering (special light weight tissue), streamlined wheels, all ribs and tips printed on first grade balsa, formed landing gear, select gas model balsa, large full-sized plans, etc. **$1.50**

● MISS TINY—CLASS "A"

Miss Tiny started the craze for small models with her first sensational victory in March 1939 and has a long list of both A and B victories to her credit. A true "aviator's model," Miss Tiny is ideal for Ohlsson 19, Bantam, Madewell, Brownie, etc. De Luxe Kit containing 2½" inflatable heavy duty air wheels, spun aluminum cowl, aluminum and dural for fittings, both radial and beam type engine mounts, full size black and white plans with 3 photographs of ship..... **$3.95**
Standard kit, non-inflatable wheels, **$2.95.** Dry Kit, no cement, dope, **$1.95.** Plans only, **25c.**



● SKY BABY—CLASS "B"

Modelcraft's Sky Baby is designed to be flown with Ohlsson 23 or Hi-Speed Torpedo or similar motor at WIDE-OPEN throttle. With a new wing section, climb is even faster. Its glide has always been sensational. Wing span 54"—chord 7"—flying wt. with Ohlsson 23 only 27 oz. A model in which the Class B modeler does not have to sacrifice performance to appearance or vice versa. KIT Complete with air wheels, spun aluminum cowl, large full-size plans..... **$3.85**

PACIFIC ACE—CLASS "C" ●

Pacific Ace looks and flies like a real aeroplane and probably offers more actual VALUE in finely constructed and finished parts than any model on the market. For the builder who has graduated to the best the sport affords. Wing Span 66". Strictly De Luxe Kit containing complete model parts with 1 qt. dope, 1 pt. cement, 3½ yds. silk, aluminum cowl, air wheels, etc., etc..... **$8.50**
Standard Kit—3½ instead of 4½ in. wheels..... **$6.25**
Dry Kit, without wheels, dope..... **$4.75**
Plans only, **25c**

Modelcraft's Catalog is Free—Want a Copy?

★ MODELCRAFT ★

LARGEST SUPPLY HOUSE IN THE WEST ★ 7306 SOUTH VERMONT AVENUE, LOS ANGELES, CALIF.

this country to date. The U.S. Air Corps has taken delivery of a small batch of the Bell "Airacudas" as they are called, and now a new design has been completed, the prototype built and test flown, that may be the beginning of the delivery of a large number to the air corps. These new Bells will have nose wheels.

The U.S. Air Corps has not stopped buying airplanes with fabric-covered fuselages as yet. Besides holding its own in the training plane field, that type of construction is still found to be useful in planes for other branches of the air corps. The new Stinson 0-49 observation plane now being delivered to General Arnold's flying force has a fuselage of steel-tube construction, fabric-covered. Its high monoplane wing is all-metal which makes an unusual combination in aircraft structure. The root of the wing attaches to a glassed-in enclosure and is vee-strut braced. The pilot and observer, sitting in tandem, have good vision in every direction; up, down, forward, aft and either side, which makes it an exceptional observation plane. It is powered by a 280 hp. Lycoming engine and is to be used to govern troop movements. It is so designed that it probably would have run away with the Guggenheim safe aircraft contest of several years ago. As a matter of fact, when the crew become hungry they could sit the ship down in the middle of camp and partake of their Boston baked beans. The entire length of the long, 51 ft.-wing is slotted with plenty of aileron and flap area to boot. It is of straight wing design which affords simplification of construction and good flying qualities that are needed in a slow observation airplane. Gross weight is 3,237 pounds. There is no armament, and radio is its main piece of equipment.

Benny Howard has just test-hopped another one of his "darn good airplanes" in Chicago, a low-wing, open cockpit trainer. The landing gear is of the fixed type. The engine is a 125 hp. Warner Scarab air-cooled radial which pulls the plane along at 118 m.p.h. top speed. Cruising speed is 108 m.p.h. and landing speed is just under 50 m.p.h. Cruising range is 365 miles or 3 1/2 hours. Wing spread is 34 ft. In many respects the airplane is similar to Fairchild's low-wing trainer that is being delivered to the U.S. Air Corps in quantity. It is a fine little ship and may see service in the Civilian Pilot Training Program.

Most interesting is the U. S. Navy's recent award of $106,125,396 to the Glenn L. Martin Company for about 550 high performance patrol bombers!

Among the many new light planes being introduced these days, the most outstanding is the all-metal, high-wing monoplane developed by the Naugle Aircraft Corp. It may be powered with any of the 75 hp. lightplane engines and a top speed of 155 m.p.h. is claimed for it. Its stubby, tapered, all-metal wing accounts for the high speed augmented by the use of a retractable landing gear. Wing slots and flaps are provided, as well as hydraulic brakes, and with all these and other features the airplane will sell for less than $2,000. Two-place, side-by-side seating, is provided. Specifications are as follows: Span—30 ft., Length—20 ft. 6 in., Height—6 ft. 8½ in., Wing Area—123 sq. ft., Wing Loading—8.9 lb./sq. ft., Rate of Climb—1,200 ft./min., Range—470 mi. on 16 gal., Landing Speed—39 m.p.h. (Flaps).

A Flying Ercoupe in Miniature

(Continued from page 27)

is cut out of one piece of wood, not two as the other bulkheads are.

Now that you have the bulkheads pinned onto the plans you may proceed to construct the half of the fuselage right on the plans. Install, first of all, the 1/8" square strip marked MS then add all the other stringers which are 1/16" square balsa strips. Be sure that you extend the stringers 2-1/4" past bulkhead B-B so you can put A-A in later on. You should have now completed one-half of the fuselage, the right half looking from front to rear.

After you are sure that the cement has dried, remove the side and cement the other halves of the bulkheads to their mates. Now add the stringers to this side, then A-A and the tail block which is carved from very soft balsa. Cut the piece marked L-S from hard 1/16" sheet and cement it in place between A-A and B-B. The front landing strut is now bent from 0.028 music wire and glued very firmly in place.

A small piece of soft balsa is carved to shape and then cemented behind H-H.

Although covering the nose with 1/64" sheet balsa is optional, it is advisable. It is necessary around the cockpit however.

The nose block is now shaped from a hard balsa block and a small cube of balsa is glued to the rear. It fits in the square hole located in bulkhead A-A.

Now that the fuselage is complete, sight it down for any twists and correct them if there are any.

Wing

The wing is exceedingly easy to construct and the only thing that need be done is to watch out for warps. You may build the half wing shown right on the plans and the other half may be traced and then reversed.

Pin the leading edge, trailing edge, wing tip and wing spar directly on the plans after you have shaped them out of the correct size balsa. Now proceed to cut out the necessary ribs from medium 1/16" sheet balsa. You will require two of the tip ribs and fourteen of the standard ribs. The ribs are now inserted in place and cemented.

After the cement has set on the joints, remove the half wing and check for any warps. Then proceed to make the other half wing in exactly the same manner.

When both halves of the wing are complete, block them up 1-1/2" at each tip so that you will have the correct amount of dihedral and cement the center very firmly. The center section may now be covered with 1/64" sheet balsa as shown in the plans for added strength.

Now that the wing is complete we may now build and add the two rear landing struts. Shape the two struts from hard 3/16" sheet balsa then cement them in their correct positions on the third rib from the center, making sure that they are

National Champions or

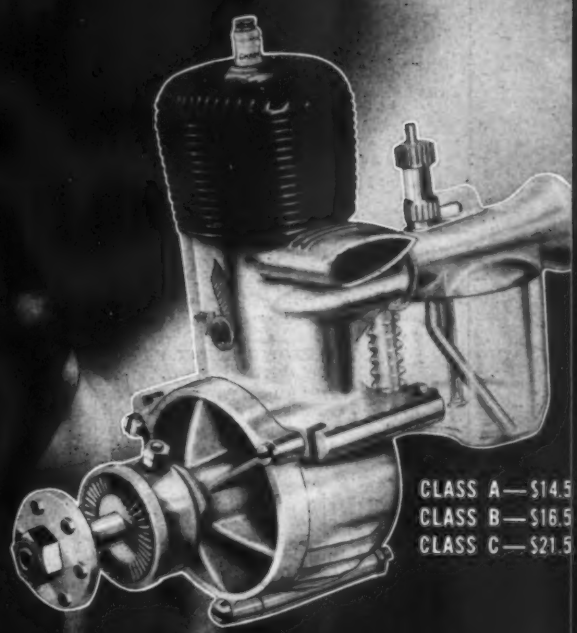
NATIONAL DEFENSE

OHLSSON *STANDARDS OF PRECISION* MEET THE REQUIREMENTS OF BOTH

As the thought of the whole country turns to National Defense, modelers will be interested to hear that Ohlsson & Rice have been selected by one of the leading Pacific Coast aircraft companies to build a number of small precision parts for its latest model pursuit ships, ordered under Government contract.

Of particular interest is the fact that the standards of precision regularly used in producing Ohlsson motors *passed the military requirements for precision in full size aircraft.*

Thoroughly proven, with more winning places at the Nationals than the next three makes of motors combined, Ohlssons are now being chosen by more modelers than any other make of engines. See your dealer and fly a proven Ohlsson in 1941. *Plant facilities have been greatly increased to take care of steadily increasing demand.*



CLASS A—$14.5
CLASS B—$16.5
CLASS C—$21.5

OHLSSON & RICE
MANUFACTURING COMPANY
"Compare the Engineering"

Ohlsson & Rice Manufacturing Co.
P.O. Box 2324, Terminal Annex, Los Angeles, Calif.
Please send new folder showing Ohlsson "precision control" production, with specifications on Ohlsson motors.

Name .....

Address .....

City and State .....

perpendicular to the ground when the wing has the correct dihedral. Bend the wire axles from 0.028 music wire and cement it very firmly. Give the joint between the wing-rib and the balsa strut several more coats of glue just to make sure.

The wing may now be covered with tissue or the new Silk-span. The author used Silk-span and found it quite good to work with especially on the fuselage where it could be wet with water so that covering the compound curves of the fuselage became very easy.

After the wing is covered it is cemented in the correct position between B-B and E-E. The leading edge is then cemented to the bottom of B-B and the trailing to E-E. A small soft balsa block is now carved to shape to keep an even flow around the fuselage beneath the wing. If you know how, this may be just a piece of bamboo paper and serves the purpose just as well and saves weight, too.

The fuselage is now covered. If you use tissue paper you will have to use many small pieces; if you use Silk-span you can cover the entire fuselage with only two pices of paper, one above the thrust line (MS) and one below.

Tighten the covering on the fuselage and the wing with water and then treat it with two thin coats of clear dope and two very thin coats of colored dope. Coloring is optional although silver will give the Ercoupe a metallic finish.

Tail Surfaces and Propeller

The tail is just as simple to make as you can imagine. Two rudders are required and they are simply cut out of 1/32" sheet balsa and smoothed down with fine sandpaper.

The stabilizer is constructed right on the plans and is made from 1/16" flat balsa strips. The leading edge is sanded round at the front and the trailing edge is tapered at the rear similar to the trailing edge of the wing. Cover the stabilizer before gluing the two rudders in place.

Cement the stabilizer in place and make sure that it is perfectly lined up and without any warps.

If you are a beginner and feel that you cannot, as yet, carve a "decent" prop, you may buy a ready-carved balsa prop of 9" diameter and cut it down to 7-1/2" and then put the shape in it. The reason for cutting it down is because most "store" props have too low a pitch.

If you know how to carve a prop then we can only say be careful and take your time during the carving, so that you have two matched blades that balance perfectly.

It is advisable to employ a free-wheel in the prop for longer flights. These may be purchased from your local dealer.

The prop shaft is bent from .028 wire but make sure that the hoop is small enough to fit into the small square hole in bulkhead A-A.

Flying

The author's ship flew perfectly "right off the drawing board" except for a small adjustment in the rudders for a turn.

Six strands of 1/8" flat brown rubber was used as power in the original model and the ship was very fast in flight, giving a spectacular climb at the beginning of each flight. If you build your Ercoupe light enough (and it can be done) you can get away with using only five, or even four, strands of 1/8" flat rubber.

For balance use a bit of clay to adjust the model in flight. The model should be flown against torque; that, is a right circle looking from rear to front. If, under power, the model dives down to the left (with torque) shave the prop down to a 7-1/2" diameter instead of an 8" diameter as called for in the plans. Of course for maximum duration of flights use a good winder and rubber lubricant.

On the whole, the model is very simple to construct and fly, but if you do run into any difficulty please don't hesitate to write the author care of this magazine, enclosing a self-addressed stamped envelope.

Let's Have More Model Airports

(Continued from page 7)

search for a flying site if one does not present itself immediately. Use airplanes—a good publicity story can be worked out by having the local airport operator make an aerial search, accompanied by the chairman of the club's model airport committee. If there is an alert publicity man in your organization he can get enough news of this search in the local papers to more than repay the airport man for his time and the use of his ship.

When a field is found, see if it will be available at all times—at least on the specified periods when the club members will be

out for test and sport flying, as well as on club contest and invitation meet dates. Perhaps you will be obliged to pay a small rental charge; maybe you can secure insurance coverage for the club members and spectators visiting the model port. Check with your local insurance agents on the latter suggestion.

How about marking off, or permanently designating, pits for the use of club members and visiting model flyers? Have signs erected announcing the field as the official flying site of your club. Perhaps you can wrangle an old wind-speed indicator as well as a "sock" from the local airport—or have some of the more ingenious club members make 'em. Rope or fence barriers should be put up to keep visitors from the flying area. Clear a portion of the field for the take-off site; smooth it down and in hot weather use oil to keep down the dust.

You may need assistance in establishing your model airport. If so, call upon the Chamber of Commerce, local civic and service clubs, the school board—anyone or any group which is interested in the community and its youth. Plenty of folks will help if you give them the opportunity. If you need runways, perhaps one of the lumber companies will build them for you in return for an "ad" painted on them. This has worked with great success in several places. Arrangements should be made for refreshments with a local concessionaire; rent or buy sound equipment for public address work during meets—some clubs have their own.

You can have your own model airport! Don't think you can't. Until recently one of the most difficult states in which to fly models because of few sites available was Connecticut. Now after much ground work, most of the clubs in the "Nutmeg Kingdom" have access to emergency flying fields.

An example of a club securing excellent flying facilities after a little hard work is the Aero-Craftsmen of Baltimore, Md. They lease their own field at Loch Raven, just outside Baltimore. Permanent pits have been established; refreshments are available at all meets; a sound system belongs to one of the leading members of the club.

In Chicago, the Recreation Department—the Chicago Park District, has rights to a field which is inside the city limits, yet removed from obstructions. This field served as the site for the outdoor events of the 1940 Nationals and received the approval of the contestants.

Boston, Mass. gasoleers were stumped for a place to fly until they remembered an abandoned race track in Saugus. Now all activity is caarried on there. Being near the sea, sometimes the tide comes in and a modeler has to wade for his craft, but all consider it a lot better than flying nearer the congested greater Boston area.

So instead of wailing the next time you're tossed off the local airport because of full-scale flying activity—use your head. Call the club together and decide right then and there to start hunting up a better site—one that's all yours. It can be done, and not the least appreciative will be your own models which may have suffered much because of the location of your present flying field.

Here Comes The "Pacer"

(Continued from page 13)

the motor will permit, then, adding a little pressure, an impression of the motor will be made on the inside of the cowling. Cut this away and repeat this procedure until the cowl fits flush with the fuselage. Cut out the space for the exhaust, making the space at least one-eighth of an inch larger all around. Cut a one-inch hole in the side of the cowling for needle valve adjusting. Glue a piece of 1/8" dowel to the bottom of the fuselage wing-rest, leaving about 1/2" protruding. This is the front rubber hook. Glue a piece of 1/8" sheet balsa inside the top of the cowl; this will prevent distortion. The fuselage is then wired, using stranded wire. Follow the wiring diagram on the plans.

Stabilizer and Rudder

The rudder is built flat and the plan is self-explanatory. After the rudder is built, a piece of 1/16" wire is forced into the rudder and glued. This acts as the front rudder pivot.

In the building of the stabilizer first lay down the spar, leading edge, trailing edge. Glue 1/8 x 1/2" ribs in place and allow to dry at least two hours. Remove from the board and cut to airfoil shape as shown in stabilizer detail. Pin the stabilizer to the fuselage; glue bulkhead B9A to the stabilizer; insert stringers in place. Note center stringer is 1/8 x 1/4". Cut out underslung rudder and glue to the bottom stringer *after covering.*

Wing

Make a full-size layout before starting construction. Consult the dimension chart on plate two to plot the outline. Connect the points established, by a strip of thin pliable balsa held in place by pins.

The wing is made in two halves. The bottom spar will have to be elevated an eighth of an inch because of the undercamber. After this is done slide all the ribs into positions, attach the trailing edges, leading edge and top spar. Allow to dry at least two hours, remove from board and repeat this procedure to build the other half of the wing.

After the wing has been given a few coats of cement the panels are rejoined at correct dihedral angles and reinforced with 1/16" sheet balsa. The trailing edge gussets are then glued in place. Cover the leading edge with 1/16" sheet balsa. Then cap strip the wing. The cap strips are sanded down to nothing at trailing edge. If in doubt consult side-view of the airfoil.

Covering

The covering is conventional; either heavy Silkspan, or double-tissue cross-grained. Apply with half-dope, half-glue mixture. Give ship about four coats of dope.

Flying

Before going out to fly the Pacer give the ship a preliminary check-up, giving special attention to the wing and tail surfaces; these surfaces should not have any warps if the Pacer is expected to fly well.

Three Class "B" Pacers have been built and they all fly and glide with the same adjustments; that is, wing at zero on the wing-rest, stabilizer set at 3/8" positive incidence as stated on the plans, and 3/8" *left rudder.* The motor should have two degrees down-thrust and two degrees left-thrust.

First glide the ship until the glide looks flat. If any adjustment is needed it will be about a sixteenth of an inch negative or positive in the stabilizer.

Set the timer for about 20 seconds; the first flight should be under very low power. Launch the Pacer and watch the flight carefully. Under power the Pacer should climb in about a *fifty* foot circle to the *right* and when the motor cuts out it should glide in about a two-hundred-foot circle to the *left.* Different ships may need slightly different adjustments, but all Pacers, without exception, climb to the *right* and glide to the *left.* With these adjustments, when the ship is climbing the left rudder and left thrust will prevent the Pacer from turning too sharply to the right.

If the ship reacts favorably fly it again on the same power and engine run. The Pacer should be flown about ten times more, with slight increases in power every two or three flights, until the motor is wide open. If all the instructions have been followed correctly you should have a perfectly flying ship that will give you many enjoyable days of flying. Good Luck!

If any further information is required write to the author, care MODEL AIRPLANE NEWS. Enclose a stamped, self-addressed envelope and we will gladly try to assist you.

Guardsman of the Sky

(Continued from page 19)

Constant Speed propeller of the three-blade all-metal type in the ratio of .5, .56, and .667 for the three settings of the prop. It has a diameter of exactly four feet and is 61 inches in length.

The oil reservoir is located in the upper portion of the power plant compartment against the firewall and has a capacity of 18 gallons. From here it is routed into the engine and is returned through the oil temperature regulator located outside the engine cowling at the bottom of the compartment. The core-type radiator is located within a streamlined housing underneath the cowling and air is routed to it from the intake situated just under the nose of the engine cowling. From here the cooled oil is routed back up into the tank and the air is expelled out the rear of the housing.

Fuel is carried within the wing center section in the integral fuel compartments pioneered by the Seversky design. A total fuel capacity of 200 gallons of 95 Octane hi-test aviation gas is carried. The fuel compartments are sealed between the two main spars of the center section by a special sealing compound pressed into the flanges between the spars, ribs, clips and angles. A series of small fuel-tight doors are provided in the under surface of the wing center section to aid inspection and cleansing.

The carburetor air intake scoop is located atop the engine cowling just forward of the pilot's windshield, from whence the air is routed down to the carburetor through special ducts. The air intake is equipped with

controllable shutters for limiting the volume of air going to the heater, which is used in high altitude work.

The engine cowling is equipped with controllable cooling gills which are manually operated from the cockpit and are located on either side of the fuselage. These are opened when warming up on the ground and during fast, long climbs to prevent overheating the motor.

The engine exhaust faces are terminated flush with the engine cowling on either lower side of the engine. Lead-off lines from the left exhaust manifold function to pass air to the cockpit, at which point it is admitted mixed with cold air taken from a duct in the leading edge of the left wing to the pilot's cockpit.

FUSELAGE: The fuselage is built up on a series of pressed aluminum alloy channel-type formers assembled with extruded section stringers by rivets securing through the use of clips and angles the structure. This frame-work is covered with 24 ST Alclad aluminum alloy sheet covered with pure aluminum to aid in corrosion resistance. Conventional round-head rivets have been used throughout the fuselage construction. The engine mount is of chrome-molybdenum steel tubes welded together and attached to the fuselage at the firewall by four quickly detachable bolts. The engine may be removed from the engine mount by extracting nine bolts or the entire power plant section taken from the airplane by removing the four fuselage bolts. The upper portion of the fuselage is covered with sliding hatches constructed of moulded plastic acetate sheet, Alclad corner blocks and tubular rivets. The windshield is designed of shatterproof glass and is protected by three braces built horizontally about the shield at a point mid-way in its height. The arrangement of the hatches has been made to provide maximum ease of entrance and exit to the pilot's cockpit and maximum visibility and freedom for the rear gunner. The forward portion of the cockpit enclosure slides to the rear. The central portion is stationary and is bolted to the fuselage. The third section moves forward within the stationary section to provide ingress and egress for the rear gunner. The rearmost portion of the canopy slides down within the fuselage to expose the observer's machine-gun.

WING: The wing is built in three sections, the center section which carries the fuel-tight compartments, the landing gear trusses and the fuselage attachment angles and two outer wing panels. Outer wing panel construction is of the famed multi-cellular design in which no spars are used, the entire structure being a single tightly-knit group of channels each carrying portions of the flight loads into the wing bolting angle. Each wing-tip is removable by extracting screws. The ailerons are fabric covered and are of stainless steel spot-welded construction. The left aileron is provided with a small trimming tab controlled manually from the cockpit. The flaps are of the split trailing edge type and run from aileron to aileron with a break at the fuselage center line. They are in four sections, two in the outer panels and two on the cen-

ter section providing space for the landing gear fillets.

LANDING GEAR: The landing gear is of the partially retractable type of the original Seversky design. Each assembly is of full cantilever single leg design utilizing a long-stroke pneudraulic shock absorber, hydraulic brakes and streamlined tires of the flat-faced type. A large streamlined metal cover of pressed aluminum alloy is permanently fixed over each wheel. The landing gear moves directly rearward and up into recesses provided in each wing. A large formed streamlined fillet rounds out the aerodynamic cleanness of the retracted assemblies. The tail wheel is of the full swiveling, centering, locking and steerable type and is fully retractable into the aft portion of the fuselage, the opening being sealed by a pair of clam-shell doors.

TAIL SURFACES: The horizontal and vertical tail surfaces are of full cantilever all-metal design. The stabilizers are built up on the same multi-cell design as the outer wing panels and are covered with sheet Alclad riveted to the framework. The rudder and elevators are of stainless steel spot welded construction and are fabric covered. The moving surfaces are equipped with controllable trimming tabs manually operated from the cockpit. The tail surfaces are of the balanced type through the use of internal weights and small angles in the hinge lines at each outer portion.

CONTROLS: Electrical controlling has been utilized where practicable and as a result the landing gear, flaps, and various items of equipment are controlled and operated by electricity derived from the ship's battery mounted on the left-hand side of the fuselage within a special compartment. The main landing gear wheels are pulled up by small electric motors attached to their retracting struts. The tail wheel is wired in this same circuit and retracts in unison with the main wheels. Emergency manual operation controls are provided within the pilot's cockpit. The flaps are extended and retracted through a small electric motor pushing and pulling the retracting rods to which are attached the operating links. Here, too, emergency hand operation has been provided.

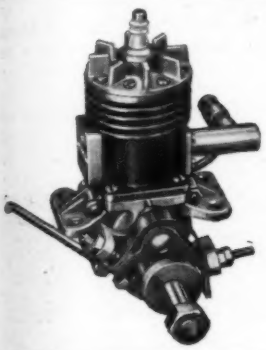
ARMAMENT: The Republic Guardsman has been advertised as the "most heavily armed two-seater in the world," which is certainly borne out in a study of its ordnance equipment. The pilot controls two Browning fifty-caliber machine-guns mounted atop the engine cowling and firing through the propeller. The triggers are mounted on the control stick and control is manual, the trigger movement being routed to the impulse generators located on either side of the engine accessory drive box. From here it is routed through impulse tubes to the gun trigger motors. Ammunition is stored in regulation air corps ammunition boxes mounted under each gun with access for loading and repair being provided by two hinged access doors on either side of the gun compartment. The rear gunner handles a single full-swiveling Browning free-firing machine-gun mounted within the rearmost cockpit enclosure section and exposed upon its retraction.

It is in the bomb cargo provisions in which the Guardsman achieves its reputation, for it mounts a single 750 pound demolition bomb below the fuselage between the landing gear and six 100 pound fragmentation bombs mounted in trios under each outer wing panel. Release is by electrical control and any of the six bombs may be released by selection. The huge aerial torpedo is mounted in a special dive bombing rack which is hinged at its forward end to special brackets located on either side of the oil cooler housing. When in the vertical diving attitude, releasing the main bomb swings the rack down and out in such a manner that the giant is thrown clear of the propeller and airplane components. The rack is then drawn in and locked in its former position.

Several modifications of this armament are available, among which are the installation of two pairs of free-firing wing guns in each outer wing panel and the installation of a power-driven rear gun turret now so popular in England.

EQUIPMENT: The Republic Guardsman is a very completely equipped and heavily-loaded combat machine. A complete set of flight and engine instruments are mounted in the rear cockpit instrument panel so that flight duties may be taken over at any time by the rear gunner. These include 2 airspeed indicators, 2 altimeters, 2 clocks, 2 compasses and 2 turn-and-bank indicators. In the front cockpit only are located a rate-of-climb indicator, tachometer, engine gauge unit (fuel pressure, oil pressure, engine temperature), manifold

A REAL GASOLINE ENGINE $4.95



Here is your opportunity to buy a kit of the famous G.H.Q. Gasoline Motor. ABSOLUTELY COMPLETE—ALL MACHINING DONE—READY TO ASSEMBLE. All you need is a screwdriver. No mechanical knowledge required.

A large bore, 1/5 H.P., engine at a lower price than any small bore engine. Complete with Coil and Condenser.

AN ENGINEERING TRIUMPH . . . Never Before at So Low a Price!!

Indeed an engineering triumph—accomplished by outstanding G.H.Q. designers and engineers, who have constructed into the G.H.Q. motor everything that years of exhaustive scientific aerodynamic research could produce—geared to the highest possible degree of perfection. But more than that, the acid test . . . an overwhelming response. Thousands of users in all parts of the country are praising, recommending, and endorsing this scientific achievement. It seems as if everyone in America wants one. The most hair-raising thrill you've ever experienced will be yours with the G.H.Q. motor—actually one of the most powerful motors ever constructed. Has broken records for amazing performance.

ABSOLUTELY COMPLETE

Everything is in the kit including Champion spark plug, COIL, CONDENSER, tank and cap, ignition wire, cylinder, piston, connecting rod, timer, crankshaft, all screws, nuts, bolts, simple illustrated instructions, etc. Every part is fully machined and finished. A SCREWDRIVER IS THE ONLY TOOL YOU NEED.

EXACTLY THE SAME PARTS THAT GO INTO THE G.H.Q. ASSEMBLED ENGINE.

30 MINUTES TO ASSEMBLE

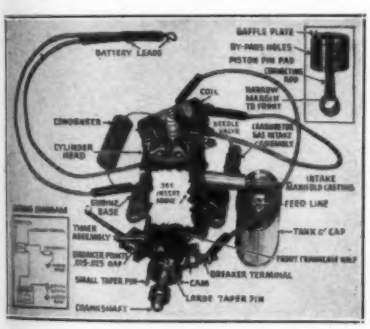
•

ALL PARTS WARRANTED

Imagine operating your own G.H.Q. ⅛ Horse Power gasoline engine—small enough to fit in the palm of your hand—yet turning up over 7000 revolutions per minute and powerful enough to fly model airplanes of from 4 to 10 foot wingspan, and propel model boats from one to six feet in length and midget cars that travel over fifty miles an hour!! There are also hundreds of other ways you can enjoy using this miniature yet powerful power plant—for small pumps, generators, compressors, blowers, fans, grinders and countless other experimental purposes.

Your G.H.Q. gasoline engine will be far more than just a toy for your spare moments. It is a scientifically constructed mechanical marvel that will thrill you with thousands of hours of pleasure. You will get a real kick out of controlling with your finger tip the surge of power your engine develops.

This engine has been tested and proven over the last seven years. OVER THIRTY-FIVE THOUSAND OF THESE POWERFUL LITTLE G.H.Q. ENGINES ARE NOW IN ACTUAL DAILY USE. Why not join the ranks of these hobbyists?



ENGINE IS COMPLETE and Ready to Assemble

Your engine comes to you with every part completely finished. Our factory-trained skilled mechanics, using the latest automatic precision machinery, have finished each and every part to the last detail. You merely assemble the parts in accordance with the few simple instructions given, using only an ordinary screwdriver, and inside of thirty minutes, your engine is ready to operate.

Not only will you and your friends have the thrill of seeing an engine ASSEMBLED BY YOURSELF operating, but you will gain a knowledge of gasoline engine theory and practice that will be a real practical value to you.

SPECIFICATIONS

4 Port 2 Stroke Cycle. ¾" Stroke. 15/16" Bore. 300-7,000 R.P.M. Bearing Surface, 1¼" Long. Crankshaft, 5/16" Diam. Rotation, Either Direction. May be run inverted. 1/5 Horsepower. Class C under NAA Rules.

G. H. Q.'s SEVENTH YEAR!

Thousands of Satisfied Users! Read some of these testimonials on file with us:

J. B., Providence, R.I.—"A few weeks ago I received the G.H.Q. motor kit and it is running perfectly. I hope to write you soon and tell you about some excellent flights."

R. H., Prairie du Chien, Wis.—"Your motors sure can take a lot of abuse and knocking around and yet perform perfectly. I have had two in a period of about two years and have seen higher priced motors give less service and performance."

W. W. W., Russellville, Ark.—"I received my G.H.Q. Motor Kit and am very well pleased. I had motor together in 1 hr. 40 min. I will place order next week for G.H.Q. Sportster Kit."

W. L., Claysburg, Penn.—"A wonderful motor that thrills any air-minded person. Strong and neat looking. As good as motors costing twice as much."

A. K., Hillside, N.J.—"I still can't understand how you can put such a dependable and rugged engine on the market at such a low price."

E. T., Sayville, N.Y.—"Received my G.H.Q. Kit okay and am more than delighted with same. You've got 'em all beat for price and performance."

R. P., Hamburg, N.Y.—"I want to extend my personal thanks to G.H.Q. for their prompt service. The motor I ordered was received within 24 hours. Such service cannot be surpassed. I also want to say that I have the motor running perfectly. I shall do all I can to help promote the success of G.H.Q."

H. H., Midlothian, Ill.—"Motor assembled correctly and performs perfectly. I am fully satisfied."

NEW FEATURES:

Lightweight 3-Volt Spark Coil; Chrome-steel, one-piece, drop forged counter-balanced crankshaft; 1¼" Bronze Bearing; Uniflow Steel Piston giving extra-high compression; Champion Spark Plug.

THE G. H. Q. GAS ENGINE CAN BE USED IN BOATS, MIDGET CARS & PLANES WITHOUT ANY CHANGES

The G.H.Q. Gas Engine sold five years ago for $35. Over 7000 were sold at $8.50. Today, you can secure a vastly improved engine kit for only $4.95 or factory-assembled for only $6.50. How is this possible? Simply because we have invested thousands of dollars in tools, jigs, dies and equipment to produce the only mass-production motor in the market. All parts are uniformly perfect.

1940 SALES OF G. H. Q. ENGINES AND KITS TOTALED 15,000

DEALERS!

Get your share of G.H.Q. business! Write for new Discount Schedule.

This identical G.H.Q. Gasoline Engine Kit is also available in factory assembled, fully bench tested and ready-to-run form.

This comes to you already tuned up . . . ready to mount and run.

G. H. Q. "Ready-to-run" Engine $6.50

★ Send for FREE literature on G. H. Q. Gas Engine or 6c for Jumbo catalog. ★

HOW TO ORDER: Send Only $1.00

We ship Collect C.O.D. for balance.

For shipments outside U.S. send full amount plus $1.00 for packing, postage and insurance.

G. H. Q. MOTORS, Inc.

MANUFACTURERS OF

Miniature Gasoline Engines and Model Airplanes

40M EAST 21st STREET, NEW YORK, N.Y.

ORDER TODAY — 24 HOUR SERVICE

pressure gauge, fuel gauges, fuel-air ratio indicator, needle valve assembly and half-a-dozen other conventional engine and flight instruments.

Radio equipment has not, as yet, been installed but complete provisions have been made for transmitting and receiving radio equipment. The design and types of this equipment is being left to the purchaser. In addition, radio direction finding equipment, marker beacon receiver, and similar navigation equipment may be installed.

The crew is provided with complete oxygen equipment, inter-phone communications equipment, emergency rations, cockpit heating and ventilating and dual controls. Four flares and flare racks have been provided with controls in both cockpits to be used for emergency or military signaling. The pilot also handles a Very signal pistol with one dozen assorted flares for use in formation and distress signalling.

DIMENSIONS: The Republic Guardsman has a wing span of 36 feet and an overall length of 26 feet 10 inches. It is 9 feet 10 inches high.

AREAS: The wing has a total area of 225 square feet including ailerons. The ailerons have an area of 19.3 square feet, the rudder 9.5 square feet, the vertical stabilizer (fin) 9.96 square feet, the elevators 16.2 square feet, the horizontal stabilizers 18.9 square feet and the flaps have a total area of 27.86 square feet.

WEIGHTS: The Guardsman has an empty weight of 4446 pounds. It has a useful load of 1576 pounds giving it a gross weight of 6022 pounds.

These weights give it a wing loading of 26.7 pounds per square inch and a power loading of 6.34 pounds per brake horsepower.

PERFORMANCE: The Republic Guardsman has a top speed fully loaded of 315 miles per hour at 14,300 feet. It has a cruising speed of 285 miles per hour at 64% throttle. It has a service ceiling of 30,000 feet and can climb to 3,000 feet in one minute. It has a maximum range of 1,800 miles with permissable over-load of fuel in the reserve tank within the fuselage. Its normal range is 675 miles with 130 gallons of fuel.

A full squadron of these Republic Guardsman fighter - attack - dive - bombers would place any small nation on the classified list of "Not to be Annoyed" countries. With their high top speed, terrific armament and long cruising range together with their fast and high climbing ability, these Guardsmen of the Sky would do much to insure and preserve peace among the small nations to the South of our great United States. And they are not expensive either; you can buy a complete Republic Guardsman (without motor, of course, which would have to be purchased through Pratt & Whitney) for only $24,850, which would make a whole squadron of 18 of them cost a government only six hundred thousand dollars complete with motors and equipment. They would more than pay for their investment in national peace and security and national defense protection. For they are true "Guardsmen of the Skies."

Building the Pusher Glider

(Continued from page 9)

saying, "Fit for expert or beginner alike"; the expert model builder will wish to try out the unique design, and the construction is so simple that the beginner will find absolutely no trouble at all.

But enough talk: Let's get down to building the Pusher.

Construction

We shall make the wing first. Try if possible to get a sheet of glider wing stock. This is a sheet of wood with an almost-perfect airfoil cut into it. A piece 3" times 15" times 5/32" is required for the wing. If you cannot get this special wing stock you will have to cut the airfoil into the sheet balsa yourself. Use a very sharp knife with a long blade to trim the sheet to an airfoil. Short thin chips are best for getting a true and even airfoil in sheet balsa.

Make a full-size cardboard template of the wing. From this template trace the wing outline onto the sheet balsa and trim it to shape. Now sand the wing with various grades of sandpaper finally winding up with 10-nought. The wing is now given the correct amount of sweep-back and 2-1/4" of dihedral at each wing tip. Make sure that the dihedral joint is strong by putting at least four coats of heavy glue on it.

To preserve the finish on the wing, two or three coats of clear dope sanding in between each coat.

The stabilizer (really the elevator) is made in very much the same manner as the wing. As on the wing, the stabilizer is cut from specially cut glider stock.

The outline of the stabilizer is very easily gotten by scaling up the graphed sections.

Don't forget that dihedral is also used in the stabilizer as in the wing; only 1" dihedral is used in the stabilizer though. About four coats of glue is applied to the dihedral joint. The stabilizer is also treated with clear dope in the same manner as the wing.

Just a little tip. Put a few coats of cement along the leading edge of the stabilizer. This will prevent the little dents from appearing in the leading edge when the stabilizer hits rough rocks or trees, etc.

The rudder is now cut from 1/16" sheet

balsa. The correct rudder is produced by scaling up the graphed rudder plan.

The fuselage is now carved from a very hard 1/4" by 1" by 14". We must stress that this piece of wood used for the fuselage MUST be of the strongest wood obtainable, but not necessarily the heaviest. When carving the fuselage to shape be sure to carve with strokes away from your body or else you will be nursing a few badly cut fingers. How do we know? Well, we had the fingers.

Now that the fuselage is finished, cut two small "vees" on the top of the fuselage in the positions where the wing and the stabilizer are located. The stabilizer and the wing are now cemented firmly in their correct positions and pushed snugly into the "vees" provided for them. After the wing has set firmly, then the rudder is cemented into place. Be sure that the rudder is not off-set in any direction.

The fuselage is now given two or three coats of clear dope. It is advisable to put a little red trim on the fuselage or rudder to provide better visibility when the Pusher is somewhere where the only direction possible is down. Very thin red dope should do the trick without adding too much weight.

The following adjustments are for a right-handed person; if you are a "lefty" just reverse the procedure.

Looking from front to rear the rudder is given about a 1/16" warp to the right. Warp the rudder to the left for "lefty." Check the wing and stabilizer for any wash-in or wash-out. If there is any wash present remove it.

When first testing your Pusher be sure that the day is rather calm. Once your model is adjusted and you know how to launch it you may fly under any conditions.

First balance your model by the addition of modeling clay to the nose if it is needed. The author's two models needed no clay at all but the balance varies with the grades of wood used. The glide should be as long and as flat as you can get without having a mush.

Like everything else there is a certain knack to launching a glider in order to get the best possible height. Hold the fuselage midway between the stabilizer and the wing with the thumb and the forefinger. The motion used is very much like the motion used when throwing a baseball upward at a 70-degree angle. Only when you throw your Pusher be sure to use twice the amount of "oomph" as when throwing a baseball. The glider is released not at the top of the arc, but the moment the arm starts to swing down the fingers are relaxed and the glider starts to soar upward with terrific speed. A most important fact is NOT to twist the wrist for if you do the glider will not go upwards but smash into the ground.

If the glider pulls out of the toss before you think it has spent all of its force, a little outside bank during the throw will tend to correct this.

Well it seems that we have used enough space here so how about taking your Pusher to your flying field and see what it will do as far as cloud hopping is concerned.

Model Designing Simplified

(Continued from page 21)

board which are unusually large, will be required. If this is inconvenient, it is wise to make them half-size; that is, to a scale of half an inch equals one inch. Here we will follow the latter procedure.

The first step is to draw in the plan view of the airplane. Start by laying out the wing, drawing a vertical line marked CL on your drawing. This will be the wing centerline. It should be located 10" from the bottom border line of the drawing; this will represent 20" on the drawing. On this line lay off a distance representing 21", which will be the span, about 1" from the left border line. Measure off the chord of the wing perpendicular to the span line so that the wing's leading and trailing edges will be equidistant from this line; then draw in the wing, rounding the tips to a form similar to the one shown in the drawing. At the center of the span line, and at right angles to it, draw the center line of the motor stick. Now, measure off a distance representing 10-1/2" from the span line, to the right along the center line of the motor stick. At this point, draw the span line of the stabilizer parallel to that of the wing; on this line, indicate the stabilizer span. This is to be 9.5". Measure the stabilizer cord at right angles to the stabilizer span line and draw in the leading and trailing edges equidistant from it. The cord is to be 2-3/8, therefore, both the leading and trailing edges will be 1-3/16 of an inch from the center line of the stabilizer. Draw in the round ends of the stabilizer, similar to those shown on the plans. You may now draw in the motor stick 1/4" wide. This is represented by two lines passing under the wing and stabilizer each 1/8" from the center line of the motor stick, previously drawn. The stick should extend forward from the center of the wing, or wing span line, 6-5/16ths of an inch. One-eighth of an inch should be allowed between the front end of the stick and the rear face of the propeller hub which distance will be taken up by the vertical leg of the propeller bearing and the washer. The propeller depth is to be 3/4", therefore, its center line will be 1/2" in front of the motor stick. Draw this line in perpendicular to the center line of the motor stick and extending 4" to either side of it. Next, draw in the line representing the rear, or trailing edges of the propeller through the point 1/8" in front of the motor stick and parallel to the propeller center line. The line representing the propeller leading edge should be drawn in like manner, 3/8" to the left of the propeller center line, allowing a depth between the two lines of 3/4". The curves representing the propeller tips should be inserted connecting the trailing and leading edge lines as shown in the drawing.

The next step is to draw in the landing gear. This should be located well forward in order to weight the nose and give proper balance to the ship. The best material to use is wire, the diameter of which should be 1/32" in this size model. The construction should be simple. An efficient type is one which has single struts, at the end of which wheels are attached. The upper ends of the struts should be attached to the stick 1-1/4" from the nose; this will allow sufficient clearance between the propeller hook and wire struts so that they will not interfere in flight.

The distance between the wheels of the landing gear should be about 5-1/2", sufficient to retain the balance of the model when taking off and landing. A general rule to follow is: "Make the tread width equal to the distance from the ground to the wing." The landing gear is shown on the drawing, located in the proper position, with wheels of 1-1/4" in diameter.

The wing of the plane is to have six ribs, two at the center which are to be cemented tight together and two on each pinion (half wing) between the center and the tips. The space between the first and second ribs, measuring from the center, should be slightly less than the distance between the second and third ribs. Such a layout helps to equalize the tension on the rib, due to the spring of the balsa sheet when cambered. Insert these on your drawing as shown.

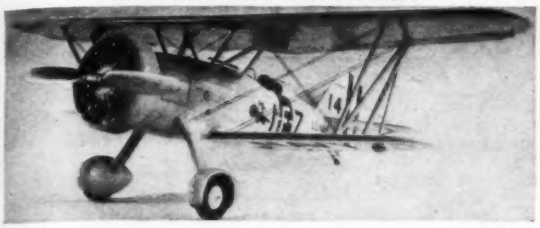
Side View Layout

Now you have the plan view complete. The next step is to draw the side elevation. To do this, project all the center lines of the various parts, such as propeller, wheels, wings, stabilizer, etc., down across the space on which you intend to draw the side view. Commence by drawing in the motor stick. Then draw in the wing, fin and propeller in their proper positions.

The propeller bearing should be shown fastened to the under side of the front of the stick. This should be fastened with thread. The tail skid is attached to the rear and should be drawn in as indicated. The side projection of the landing gear then is made.

In drawing in the wing, note that the front edge of the wing should be raised the proper amount, giving it an angle of incidence of 2 degrees. It is to be held in this position by a small elevation block, marked EB on the drawing. The wing is to be held in place on the stick, by two sheets of balsa cemented to the sides of the elevation block and center rib unit, marked WF on the draw-

CURTISS HAWK F11C4 PURSUIT



32½" Span. Length 22¾". 1" Scale. Weight 6 oz. Color grey, top wing yellow.

THE MOST EXCLUSIVE AND FINEST EQUIPPED MODEL IN THE WORLD. MOVABLE CONTROLS WORK FROM COCKPIT. A special de luxe model, one of the most beautiful ever made. Set contains a 4½" scale Wright Cyclone celluloid motor, detailed push rods, fins, etc., like real motor, 4½" aluminum cowl, 10" steel type carved prop shown, 2⅛" wheels, tail wheel, star and rudder insignia and lettering, rubber, windshield, instrument board, flying wires, 4 aluminum step plates, aluminum wing walks, ready cut wheel pants, washers, 3 oz. grey paint, ½ oz. yellow, ½ oz. red, 2 oz. glue, etc. All other parts are printed on balsa wood. 33"x44" scale drawing. Const. set, complete in labeled box, postpaid..... **$4.50**

GRUMMAN F5F1 SKYROCKET FIGHTER

24" Span. Length 17". Weight 3 oz. Actual Photo of Model

A sensational new scale model of the Navy's fastest fighter. The model flies well, using two 7" propellers. Const. set contains all parts printed on balsa, two 2½" turned balsa motor fronts, two 7" carved props, wheels, insignia, colored dopes grey and yellow, glue, full size scale drawing, and all parts. Const. set, postpaid..... **$2.95**

LOCKHEED ELECTRA

27½" Span. Length 19". ½" Scale.

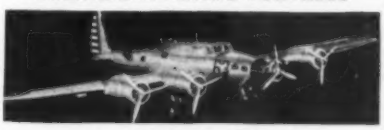
This is an exhibition model, with all parts printed on balsa, two 2" celluloid motors, two 2" aluminum cowls, 4" chromium props, two 1½" M & M pneumatic air wheels, set of paints, and all parts. Set postpaid..... **$4.50**

CURTISS P36 ARMY PURSUIT

37" Span. 1" Scale. Color, silver.

Set has turned motor front, set of paints, glue, all parts printed on balsa, and full size drawing. Set postpaid..... **$3.25**

BOEING B-17 FLYING FORTRESS



44" Span. Length 30". Color, silver.

Set has all parts printed on balsa, four 2" turned balsa motor fronts, four 4" carved props, celluloid wheels, set of paints, glue, and full size drawing. Set postpaid..... **$4.50**

SPECIAL DE LUXE SET. Includes following exhibition equipment: Four 2" aluminum cowls, four 2" celluloid motors, four 4" 3-blade cast metal propellers, two 2¼" M & M pneumatic air wheels. Const. set, postpaid..... **$6.25**

BOEING F4B4 NAVY FIGHTER

23½" Span. Length 14½". ¾" Scale.

Set has 3" celluloid motor, 3¼" tapered aluminum cowl ring, set of paints, etc. Postpaid..... **$2.95**

BOEING P26A ARMY PURSUIT

22" Span. Length 17½". ¾" Scale.

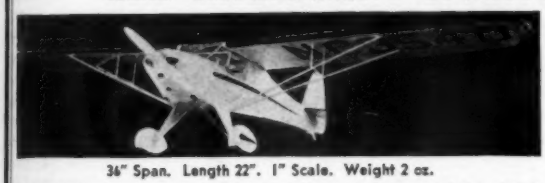
Set has 3" celluloid motor, 3¼" tapered aluminum cowl ring, paints, etc. Postpaid..... **$2.75**

NORTHROP A-17 ARMY FIGHTER

24" Span. Length 17". ½" Scale.

Set has 7" prop, turned motor front, wooden wheels and complete set of paints. Postpaid..... **$2.50**

NEW TAYLORCRAFT SPORTPLANE



34" Span. Length 22". 1" Scale. Weight 2 oz.

Taylorcraft Model on Floats

COMBINATION LAND AND SEAPLANE SET

A beautiful exact scale flying model with unusual flying range, so light it will rise from land or water in 6 feet. Const. set contains all parts printed on balsa, carved propeller, hardwood wheels, 2 oz. white dope, ½ oz. black, glue, full sized scale drawing, and all parts to build, and parts to make floats. Set p.p..... **$1.50**

CURTISS SO3C01 NAVY SCOUT SEAPLANE

30" Span. Length 24"

Set has all parts printed on balsa, set of paints, Scale drawing and all parts to build. Const. set postpaid..... **$2.95**

CURTIS F11C4 SOLID MODEL

10½" Span. Length 7½"

This is a special deluxe solid model. Set has completely finished balsa fuselage, cockpit cut out, routed pants, wings cut to shape. 1½" deluxe cast motor, alum. cowl, 3 bladed cast prop, paints, drawing and all parts. Set p.p..... **$1.50**

ORDERING INSTRUCTIONS

Orders sent west of Mississippi, add 15c postage—Foreign, 20c.

BOEING F4B4 NAVY FIGHTER

Solid Exhibition Model

22½" Span. Length 14½". ¾" Scale.

Set contains completely finished balsa fuselage, with cockpit cut out, motor hole cut out and headrest attached; all you have to do is paint it. The wings, tail, and rudder are all cut to shape, but have to be sanded to proper curve. A 2" celluloid motor with aluminum motor front, 2¼" tapered aluminum cowl, 7" scale chromium plated propeller, celluloid wheels, complete set of colored paints, glue, filler, and full size drawing. Set. postpaid..... **$4.50**

SEVERSKY P35 ARMY PURSUIT

32" Span. Length 25". 1" Scale. Color, silver.

Set has 4" turned balsa motor front, 10" carved prop, balsa wheels, tail wheel, rubber, all parts printed on balsa, 3 oz. silver dope, ½ oz. black, 2 oz. glue, etc., insignia, and full size scale drawing. Const. set in labeled gift box, postpaid..... **$3.25**

New Catalog No. 6—10¢

Beautifully illustrated 7½"x9½" 16 page catalog showing large photos of Army and Navy Fighters, Gas Motors, Gas Models, etc. Includes 4-page 1941 catalog supplement. Get yours today. 10c coin.

MINIATURE AIRCRAFT CORP.

83 LOW TERRACE
STATEN ISLAND, N. Y.

ing. These fit up close to the under side of the wing sheet and have protruding ends which run forward and backward along the motor stick. The distance between them should be 1/4" so that they will fit tightly to either side of the stick. The wing unit is to be held in place by rubber bands, one around each protruding end and around the stick, fore and aft of the wing.

The propeller shaft is to pass through a hole in the vertical leg of the bearing. One strut end is fastened in the hub of the propeller, the other extends rearward and terminates in a hook, to which the front end of the rubber motor is attached. The rear of the motor is looped through an "S" hook which is fastened to the tail skid.

Draw in these parts, allowing slack in the rubber motor, as shown. When this is done mark the correct dimensions on your drawing, with notes which will help you readily to determine the names of the parts and their sizes. This will be of assistance when you build the ship.

You will note on the drawing that the rear end of the motor stick is tapered in depth from 5/16" at a point A, 10" from the nose, to 1/4" deep immediately in front of the stabilizer. Your side view is now complete.

Front View Layout

The third step is to draw in the front elevation. Start by drawing a line parallel to the wing center line in the plan view, 6-5/8" below it on your drawing. Then project the center of the motor stick, wing tips and other parts shown in the plan view, down across this line. On the wing-tip projection lines lay off a distance equivalent to 1-3/4" above the horizontal line, which is to form the basis of the plan view. This represents the amount of wing dihedral.

Then draw in the lines representing the upper surface of the wing, from the intersection of the center line and the base line, to the points on the wing-tip projections. The leading and trailing edges may then be drawn below these two dihedralled lines. Their ends should be curved upward at each wing tip to indicate that the tips are rounded. The accompanying drawing shows this clearly. Small lines, running between the leading and trailing edge lines, are then inserted to represent the ribs. Immediately below the center of the wing draw in the front view of the elevation block and below this the end of the motor stick and bearing.

The stabilizer should be drawn across the top of the motor stick and the fin perpendicular to it, as shown. The wheel tread should be laid out on the ground line, which is 5-1/2" below the stabilizer projection. The wheels should be 5-1/2" apart. Then the wire struts may be drawn in, indicating the proper angles at the wheels. At their upper ends the wire forms a loop which passes up the sides and over the stick.

All that remains now is to make the parts drawings. These are to be made full scale and not half scale like the three views of your plane. All parts of irregular shape, or which are not shown clearly in the three view drawing, should be included in this group. For instance, the propeller block, elevation block, landing gear, tail skid, propeller shaft, wing section and bearing. Locate these conveniently in blank spaces. When this is done it is always wise to go over the drawing carefully to see that all information, measurements, etc., are included, so the plane may be constructed from the drawing without delay. It is customary, when completing your drawing, to put in your name, the date and the name of your ship in one corner.

If you have laid out your drawing as instructed you will be ready to build the plane, the description of which will be given in the next article.

The Physics of the Airplane

(Continued from page 31)

object may be located, the image will lie between the principal focus of the lens and the lens itself. The rays of light emanating from the object diverge upon leaving the lens as if they had come from some point beyond the lens. The image created in this manner will be diminished, erect and virtual.

Perhaps one of the foremost aeronautical optical instruments is the camera. A vital agency in war-time for the location of hostile troops, batteries and supplies, the aerial camera is also an important peace time accessory. Aerial surveying and mapping, crop surveying, investigation of soil erosion—these are only a few of the extremely useful activities made possible by the recent progressive advances in aircraft camera design. The highly scientific aerial camera is but an improved version of the elementary photographic camera shown in principle in Figure 2.

A lens, or possibly a combination of lenses, placed at the forward end of the camera functions in producing a real image on the sensitized film or plate located at the opposite end of the device. The distance between the lens and the sensitized medium is designed to be adjustable. This arrangement permits the distance to be altered in such a manner as to adequately focus the image on the sensitized medium. The housing which comprises the main body of the camera is constructed so as to exclude all light except that which emanates from the object itself. The celluloid film which is commonly used for this purpose is sensitized by treatment with a silver oxide. The image formed by means of the lens acts upon the film but does not become visible until the film is immersed in a chemical mixture known as the developer. A shutter or diaphragm is provided to limit the quantity of light admitted through the aperture to the lens.

The size of the opening controlled by

the diaphragm is specified by reference to the ratio of the focal length of the lens and the diameter of the opening. Should the constant thus derived be doubled, the time of exposure of the film must be increased four times. This is true since the amount of light entering through the lens is dependent upon the area of the opening and, in turn consequently, upon the square of the diameter of the opening. Aerial cameras are usually automatically controlled and operated for mapping or military photography. The pilot flies at a predetermined speed and altitude and corrects for drift, and when over the area to be mapped he presses a switch into which automatically sets the camera into operation. Many exposures are made for a certain strip of territory and then when the films are developed, the photographs are pasted together and form a mosaic map.

The sextant is an instrument to measure the altitude of heavenly bodies in relation to the horizon. It is so called since its movable element is capable of rotation through an arc which is equivalent to one-sixth of a complete circle. As with its companion instrument, the octant, the sextant represents a most essential item of equipment aboard aircraft. Planes are maintained on their courses by means of celestial navigation, notably on the transoceanic air routes. Referring to Figure 3, we observe that the sextant consists of a fixed mirror, D, and a second mirror, E, mounted on an arm capable of rotation about an axis passing through the center line E. At the lower extremity of the arm a vernier is mounted by means of which the position of the arm can be read on the graduated scale, constituting the segment of a circle which gives the instrument its name. Only one-half of the mirror, D, is silvered. This arrangement permits the observer to line up the instrument with the horizon through the telescope, T, mounted on the adjacent leg of the instrument. Light emanating from any distant object is reflected from mirror, and is again reflected from the silvered portion, passing into the barrel of the telescope.

We can easily see that the observer is thus receiving light simultaneously from two sources—from the direction CDT and from the direction AEDT. When determining the position of some heavenly body, a star for instance, the observer rotates the mirror until the light emanating from the star forms an image of the body in the telescope, after reflection at E and D, which appear to lie on the horizon. Simultaneously, light is being received along the horizontal axis of the telescope from some reflecting surface which has previously been selected to serve as an artificial horizon. By noting the angle through which it became necessary to rotate mirror E, from the zero position (at which it was parallel to mirror D) to the position at which it reflects the light emanating from the star down the axis of the telescope, the angle of elevation of the star above the horizon is immediately obtained. Actually, the angle through which E is rotated is only one-half the angle of elevation of the star above the horizon. However, by marking each degree of rotation of the arm on the fixed scale as though it represented two degrees of rotation, the scale of the instrument is so calibrated that the observer can read the elevation of the star directly. Observation is taken on the so-called "fixed" stars, and the relative position of the observer on the earth's surface can then be gauged.

The optical pyrometer is employed in aircraft manufacturing plants where heat treatment of metal aircraft components is effected. By reference to the Figure 4, we can see that it consists of a telescope, within the barrel of which is mounted a small 6-volt electric incandescent lamp designated by symbol L. The current through the filament of the lamp is supplied by a battery and is variable by means of the regulating rheostat provided in the electrical circuit. In operation the telescope is focused on the heat-treating furnace with the filament of the lamp lighted. Should the filament become hotter than the interior of the furnace, its image will appear as a bright line against a darker background. Conversely, if the filament is colder than the furnace, it will appear as a darker line. When both filament and furnace interior are at the same temperature, it will of course be impossible to observe the image of the filament at all. In this case, the current supplied to the filament can be measured by means of an ammeter inserted in the electrical circuit. Consequently, by calibrating the pyrometer in such a manner

that the current in the ammeter will correspond to given values of the furnace temperature in degrees Centigrade, the current readings will give a measure of the furnace temperature at any desired instant. The user of the instrument can refer to an empirical curve which has been previously plotted and thus determine an unknown temperature at the instant the current in the filament, when this member is no longer visible, is recorded.

The lens is also of interest in aerial machine-gun sights. In this instrument the sight is a simple telescope. The telescopic lens is also part of certain testing equipment to read fine graduations on a Brinell tester scale. Certain telescopic devices are also used in structural testing operations to read the degree of deflection of beams, etc. Thus we conclude this article on lenses with emphasis on the part physics plays in modern airplane construction and operation.

Gas Lines and Air Ways

(Continued from page 25)

the ship to dive. When speed is gained the device changes the elevator setting to produce a loop. After the loop the ship levels out again and the cycle is repeated several times. When the engine cuts out the controls go into neutral.

We have some very interesting comments and pictures from Dallas B. Sherman, 1st Lt. A.C., N.G.U.S. who is Asst. Operations Officer of the 111 Observation Squadron, Municipal Airport, Houston, Texas. Lt. Sherman is shown in picture No. 9 with a very unique gas job he has built. First, it is built along scale lines and, second, it carries a dummy pilot whose weight is of a certain proportion to the piston displacement—but we will let him tell you the story:

"Of late months from far and wide on all sides (including your publication) there have come cries for more originality in designs of gas models. This appeal is especially evident from both the contestant and the spectators at model contests. Chief 'bone of contention' seems to be that the present-day gas models neither look nor fly very much like real full-sized airplanes. In our local club the cry for some solution became so demanding that the undersigned together with Mr. H. L. Williams, founder and first president of the Houston Miniature Aircraft Club, set to work on this problem several months ago.

"In our opinion, the main trouble appeared to be that the present-day gas models have wandered too far afield from their original purpose and conception. We were ready to concede that rubber powered flying models would always be pretty much MODELS and necessarily so, because of aerodynamic balance. But when we have gas engines to power the craft, we could see no reason why the models so powered should not follow more closely big-ship design; and in this manner teach the lessons to be learned in full-sized aircraft through designs adaptable for full-sized machines. Any quick survey will disclose that the popular gas models of today give little thought to any possibility of their design being adaptable for full-sized craft. The departure of gas models from the real thing has come doubtless from the ever-present demand for increased performance above all else. The makers of the contest rules have long realized this, and have attempted to 'stem the tide' with wing-loading requirements and other weight-addition ideas. To us it appeared that the main fault lies in the fact that while real aircraft all have a job to do in addition to just flying, the model has none. Thus the premise of our approach is to give the gas models a simple job to do in addition to their flying.

"With the single exception of the few experimental radio-controlled target ships, the simplest job which any full-sized ship can 'earn its salt' at is to carry at least one occupant. So this is the job we selected to give to the gas models, or at least to a new class of gas models which we hope will appeal to the more serious builders. We are certain that you will recognize the possibilities for development of designs and for the increased aviation knowledge to be gained from the adoption of some such class of model as this.

"The sketch below the pictures shows the type of occupant which we suggest as suitable and with which we have carried out extensive experiments. Principle of the occupant is that 'he' is of weight and dimensions proportional to the engine piston displacement. There should, however, be a special set of rules for the class of ships carrying occupants in order to get the most benefit from the idea: He should be entirely an independent unit and contain no parts necessary for the functioning of any part of the model or the engine; he should be provided with access and egress from the cockpit or cabin without the necessity of any folding-up in the process and without the removal of any part of the main structure of the ship; he should be provided with adequate protection from the slipstream in either shielded cockpit or cabin; he should have normal forward and side visibility as would be required for safe piloting of any ship; he should have a secure seat and a safety belt; a dummy instrument panel should be provided within line of normal forward vision, and dummy hand and foot controls should be within 'reach'. An interesting and instructive extension of this idea would be to allow for multiple-place ships, with a handicap percentage in time granted for each additional occupant carried in addition to the one required.

"Original steps have been taken toward the legal protection of this idea. This will not prevent the individual builders from making occupants of this type for their own use, but is protection only for commercial manufacture and sale."

Picture No. 10, showing the close-up of model, is most realistic and at first glance might be taken for a large plane. The dummy pilot rests against one wheel.

In picture No. 11 he is shown in the

cockpit of the plane.

We believe that Lt. Sherman's idea is excellent. On many occasions model builders have advocated a contest event for weight-carrying; here is a unique and practical application of this feature. It is valuable to the model builder because it forces him to consider the strength-weight ratio of the plane. In other words, he must get so much strength into his structure with as little weight as possible. In order to do this a designer must understand the stresses developed within the structure, which leads him, if he chooses, into the application of various forms of mathematics taught in school and college. It is a real engineering problem.

At a large model contest held at the "late" New York World's Fair a very unusual and original design of a model pursuit ship was exhibited. It is shown in picture No. 12. This was not only designed for efficiency, but from its looks, apparently to scare the enemy into surrendering. It was built by William Samph. Nothing is known of the performance but some interesting experiments might develop from trial flights of models of this type. Try it out sometime and let us hear about it!

Lawrence E. Cook of 620 South 20th Street, Harrisburg, Pa., is a scale model fan who has sent us picture No. 13, showing his detailed scale F11C-4 navy pursuit plane. It required 275 hours to build, being equipped with movable controls, navigation lights operated from the cockpit and many other details. A beautiful finish was supplied by ten coats of dope.

To see what good workmanship will do, look at picture No. 14. Here is a Ryan ST model built from a ten-cent kit. It has a wing span of only 8 inches and is very realistic in appearance, displaying fine workmanship considering its small size. The builder is Fred Zasowski of 12 Keystone Street, Buffalo, New York.

Club News

New York

Stephen Kasprozok, corresponding secretary of the Prop Spinners Club of 139-19 Jamaica Avenue, Jamaica writes and tells us that this club held its first annual contest on October 6th. Many thermals helped flights in spite of the strong winds which prevailed. The highest time was made by Neal G. Fowler when he flew his ship for 7' 20". Pinky Fruchtmon made 275 seconds with a Class A job, to win and George Hauser did 220 seconds, the highest time, to win Class B.

Arizona

The Phoenix Model Airplane Club annual gas model contest was held October 20th at its model flying field in Phoenix. The meet was won by Gaylord Webster with a flight of 17' on his first trial.

Texas

J. M. Thomas of 205 W. Pierce Street, Harlingen, sends us a report of a meet held recently in his vicinity. He says:

"The Rio Grande Valley Gas Model Association is in the process of being organized with its chief aim to foster local clubs in the dozen or more cities in the Lower Rio Grande Valley, plan and hold meets, etc., for the clubs. Our section is similar to the rather thickly-populated Southern California and we are planning our Association to operate in somewhat the same manner.

"Contests are held every other Sunday afternoon to maintain the interest of the builders (as if anything could kill it). These meets have done more to further model building in this section than anything that we have attempted. We may safely say that our number of builders has increased over 500% since the first of these contests was held on May 26 of this year. We now have seven clubs in the Association.

"The American Legion Post of San Benito, Texas, with the Armistice Week, Inc., held an A.M.A.-sanctioned meet at San Benito Sunday and Monday, November 10 and 11th, in connection with its annual Armistice celebration program. The rubber powered and Class A gas events were run at 2 p.m. Sunday. Monday's program included Classes B and C gas, a stunt event and a mass flight. Prizes for the contest totaled $115."

Massachusetts

The Mass. Gas Hawks of Lynn are holding regular meetings on the first Sunday of every month and a contest on the second Sunday. In the contest held November 10th, the respective winners of the first three places, and their times, were: Bruce Poton, 5:11; Leonard Day, 3:56; Cy Miller, 3:29. A camp in Amsbury has been donated for the special use

of the club for winter contest and, as Marjorie Day, secretary, says: "We won't have to use cracked-up planes for a bonfire to keep warm." Anyone interested in joining may contact the secretary at 119-1/2 North Street, Salem.

Wisconsin

Speaking about record flights, here's a flying record made by Karl Girten of Milwaukee, which fairly takes our breath away. Following are the dates, locations and the order of placing in the various contests in which he entered his ship, a Badger Flash powered with an Ohlsson "60 Custom" motor. This is what we call consistent flying!!

June 9	Milwaukee, Wis.	5th place
June 16	Madison, Wis., 1 flight,	9th place
June 23	Marshalltown, Iowa	1st place
July 6	Chicago Nationals	19th place
July 14	Oshkosh, Wis.	1st place
July 28	Ottumwa, Iowa	1st place
Aug. 4	Galesburg, Ill.	5th place
Aug. 18	Davenport, Iowa	2nd place
Aug. 25	Rockford, Ill.	1st place
Sept. 1	Greenfield, Iowa	1st place
Sept. 2	Centerville, Iowa	5th place
Sept. 22	Milwaukee, Wis.	1st place
Oct. 13	Chicago, Ill.	3rd place
Oct. 27	Chicago, Ill.	2nd place

Notices

Considerable agitation has been in the wind to change the date of the Nationals. E. Eugene Kohls of 110 E. Wisconsin Avenue, Milwaukee is considerably wrought up about it, and has some justification, for he says:

"I realize that the date of the Nationals should be chosen from the standpoint of assuring the best possible weather conditions, but I hardly think that there is much to choose in this respect between the present early July date and either the latter part of July or the first part of August. The changed date would permit state organizations such as the various Exchange Clubs throughout the country to conduct state meets and preliminary local meets all prior to the Nationals which is, of course, the proper sequence. At the present time it is difficult to 'get in' the preliminary local contests especially in the northern sections of the country, for inclement weather usually extends through the entire month of May."

What do other readers think about this? We would be happy to have their comments.

California

Mr. Carlton Wiggins of Reginald Denny Industries, Inc., has written in to correct our notice of last month:

"We have just read, in last month's Model Airplane News, the rather alarming description of the fire that we had here some weeks ago.

"The facts are these: We did lose a warehouse and the official loss can not be stated at more than $2000 to us, at the most. The loss did not include merchandise and consisted mostly of packing boxes, paper, plans, etc., so you can see that it did not hinder our carrying on business in any way.

"All the newspapers throughout this state and many in eastern states carried descriptions of the fire and announced losses ranging from $100 to $15,000. In several cases where papers and magazines reported a total or near-total loss, we definitely lost business, as various dealers held up orders. Consequently, since the fire, we have had lots of letters to write and most newspapers have retracted any exaggerated statements that they made about the loss."

New York

"Making model airplanes," Alfred Roberts, Jr., told a recent audience, when asked what his hobby is. And a short while later Alfred was selected, by a committee headed by Mayor LaGuardia, as New York's "Typical American Boy."

Alfred, who is 12 years old and lives with his parents at 126 Macdougal Street, New York, was chosen from among hundreds of boys in a search sponsored by the Bureau for the Prevention of Juvenile Delinquency. He will pose for a statue to be modeled by Harry Poole Camden, sculptor.

The committee of judges included Mayor LaGuardia, President James Marshall of the Board of Education, Dan Beard, National Scout Commissioner; Justice Stephen S. Jackson, Director of the Bureau; and Mr. Camden.

The Sky-Scrapers Model Club of Brooklin will hold a "Snowbird Contest" on February 23rd at the airport, Creedmore, New York. For further information write Mr. Carroll Moon, 473 E. 9 Street, Brooklyn, N.Y.

Many New Yorkers and those who attend national contests will remember Gordon Murray, commonly called "Scotty." Well, Gordon, felt the patriotic urge so, being a native of Canada, he took steps to join the Canadian Air Force. He now has gained his objective and is in training at Toronto. We are certain he would be extremely pleased to hear from many of his old model building friends. His address is 1 Manning Pool, Toronto, Ontario, Canada.

Connecticut

On Sept. 15 the Bridgeport, Connecticut, Gas Modelers held their Introductory Gas Model meet at Milford.

This meet was witnessed by 3,000 spectators throughout the day. It was the first event of its kind ever to be held in Milford and the turnout was very satisfactory.

About 100 contestants from Connecticut, New York, Massachusetts and Rhode Island were present, but due to the wind, which was blowing at gale force, only 40 of these flew their planes. Four planes were lost and many crack-ups occurred.

The time averages were low for the meet due to the fact that before the planes could attain enough altitude to hook a thermal they were blown to the ground by the stiff ground wind.

Paul B. MacCready, Jr., of New Haven, "walked away" with first place in Class A and Class B.

Joseph Borcynski of Hartford, Conn., made the longest flight of the day when his model disappeared from sight after a 5 min., 21 sec. flight. His second flight was 2 min., 28-1/2 sec. and then his plane was lost.

Air Youth of America

(Continued from page 25)

$1260 a year.

Opportunities such as these for jobs in the aviation industry and in the United States air services are described in a new book issued by Air Youth, as one of its educational services. Written by Charles S. Mattoon, one of the best known personnel men in the aviation industry, and in charge of personnel at all the Curtiss Wright plants, the book also carries a foreword by Juan T. Trippe, president of Pan American Airways System. Another contributor is Robert W. Hambrook, vocational specialist in aviation for the United States Office of Education.

Practical hints on the types of jobs available, the training needed for them, and the best schools for the individual boy are discussed by this new Air Youth book. A feature of unusual interest is the geographical list carried in the back of the book, where to go to get a job and how to get the necessary training.

Illustrations representing the type of aviation work done in the major aircraft producing plants, the governmental services and the larger airlines make this perhaps the most extensively illustrated book of its kind that has yet appeared. The price has been kept low, so that the book will be accessible to every boy who has an interest in the nation's fastest-growing industry.

Air Youth Scholarships

Hundreds of applications from virtually every section of the country have come flooding into the Air Youth headquarters following the first announcement of the Air Youth Scholarships. Open to all young men who are citizens of the United States and are ready to graduate from high school by June of this year, or who have graduated from high school within the past three years, the scholarships will be awarded upon the basis of "promise of achievement in aviation."

Winners will be awarded tuition for courses at one of the following three schools: The Boeing School of Aeronautics, at Oakland, California; the Casey Jones School, at Newark, New Jersey, or the Spartan School of Aeronautics, at Tulsa, Oklahoma.

The competition has been announced to close by March first and all interested are urged to write immediately to Air Youth for detailed information.

Exchange Sponsors New Clubs

Word comes from Harry Copeland that the model airplane clubs in upper New York state are very active this year. The club being led by Carl Zeh, at the Dansville High School, has thirty-six boys at work on Air Youth projects. They have already completed projects two and three, and are ready to tackle the others. The Exchange club of that town is sponsoring this group.

In Bath, and Canandaigua, Harry reports, the Exchange Clubs are also actively at work sponsoring other model plane clubs, and Harry himself is at work getting groups started at Syracuse.

Speaking of the Exchange Clubs, a letter from Harold M. Harter, national secretary of Exchange states "Recently there has come to my desk a copy of 'Model Airplane Contests: An Air Youth Guide.' We are glad to have this book and shall recommend it to Exchange Clubs and their members as a text book on model aviation meets."

Flash News

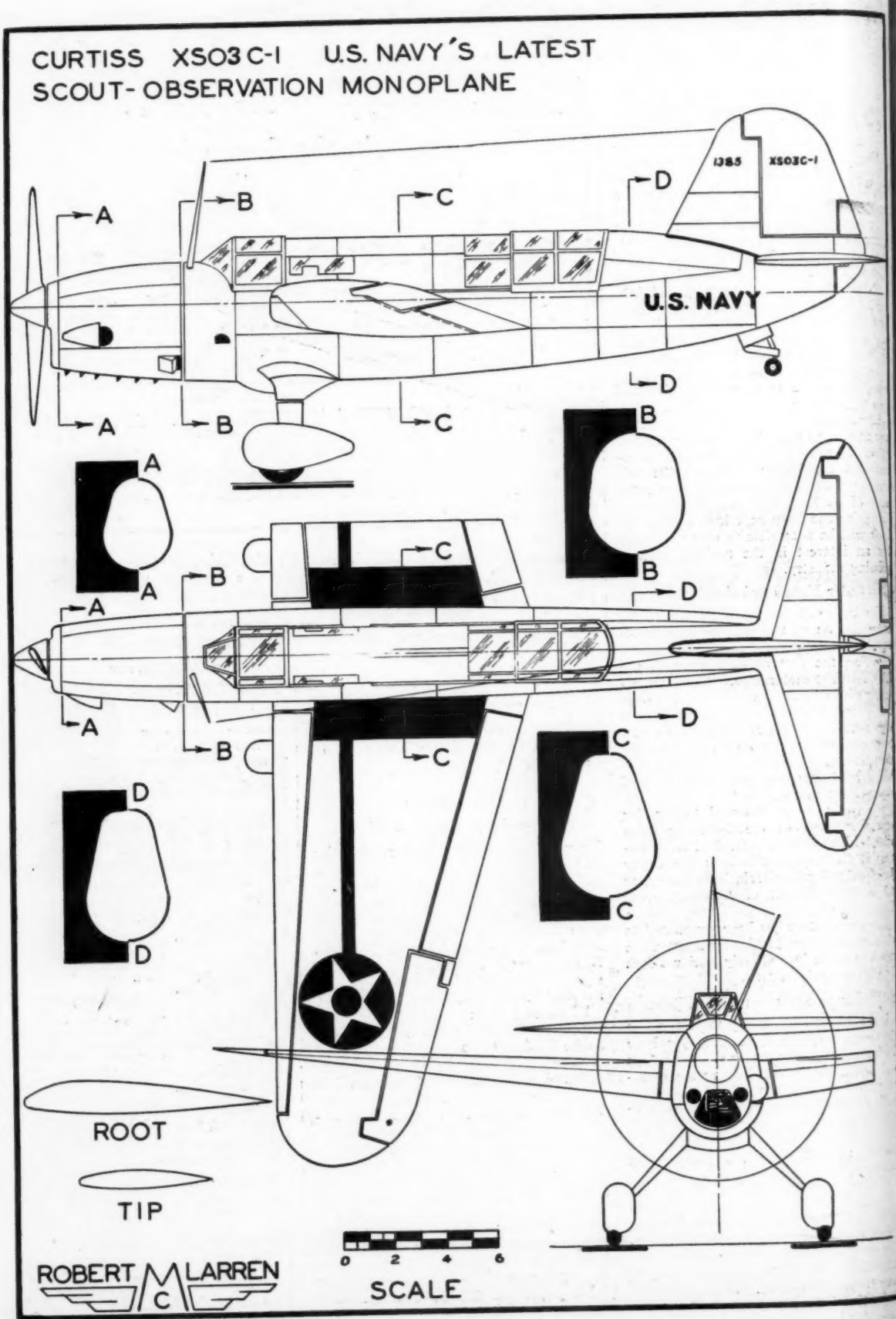
(Continued from page 33)

Navy Department for base construction on their entire eight sites, construction on which is already well under way.

The first of 400 Martin PBM-2 twin-engined long range patrol-bombers has gone into service with the 55th Patrol Squadron. The remainder of the $106,-125,000 order is well under way. Re-design includes dihedral stabilizers and angularly displaced rudders.

PRODUCTION: Douglas' new Long Beach plant, now under construction, will be the U.S.' first "black-out" plant, for the windowless plant will be completely equipped with bomb-proof shelters, fuel supply tanks, independent power supply and air-raid warning signals. The factory will be "decentralized" and the six buildings spaced apart from each other.

First of the 240 giant Consolidated Model B-24 four-motored bombers is now on its way to England. Completely camouflaged and resplendent in R.A.F. cocards, the giant ship will be flown from Newfoundland to England and will be followed by the remainder of the contract in short order. The Sperry bomb-sight is installed on the 300-miles-per-hour giants.


CURTISS XSO3C-1 U.S. NAVY'S LATEST
SCOUT-OBSERVATION MONOPLANE
1385
XSO3C-1
U.S. NAVY
A
B
C
D
ROOT
TIP
ROBERT MCLARREN
0 2 4 6
SCALE

A new lofting method perfected jointly by Ward Pearce and Joe Washburn of the Lockheed Company will speed up engineering and template layout by more than one hundred per cent. A photographic process, it does away with the tedious stylus, compass and divider method used heretofore.

Henry Ford broke ground recently on a new plant to construct the 4,000 Pratt & Whitney Twin Wasp radial air-cooled motors specified in the War Department contract valued at $122,323,020.

Two new contracts to Consolidated both from the navy: $18,529,500 for twin-engined Patrol planes and $75,313,000 for four-motored Patrol-bombers.

Lockheed employees are planning an efficacious gift to the British for Christmas: a Hudson twin-engine bomber! Employees working on the particular ship will donate their time and the ship will be christened the "Spirit of Lockheed-Vega."

Lockheed Aircraft has purchased the entire property and structures of vast Union Air Terminal (Burbank), western terminus of the five major national airlines. Airline use will continue until the million-dollar Los Angeles Municipal Airport in Inglewood is completed. The field will be used for testing and assembly of British Hudson bombers and sensational P-38 interceptors.

Newly-formed Anacapa Aircraft Corporation is now in production in its spacious Santa Paula (Calif.) factory on primary and basic training planes for the U.S. Army Air Corps.

Paul Balfour, North American Chief Test Pilot, was injured in the crash of the speedy new Model NA-73, single-seat Allison powered fighter. The ship was damaged beyond repair and the second production model is being rushed to completion. The ship was designed for the Royal Air Force as a super-speed fighter and interceptor, its lines paralleling closely that of the Spitfire.

Possibilities of a dirigible airline between Miami, Florida, and Rio De Janeiro, Brazil, loomed with conferences between officials of the Goodyear Tire and Rubber Company and Brazilian Government authorities.

Curtiss-Wright huge CW-20 twin-engined airliner has been redesigned and an attempted coast-to-coast record-breaking flight is in the offing. A single large rudder has replaced the twin combination formerly employed.

AIR LINES: President G. T. Baker of National Air Lines recently set a new cross-country record when he sped from Burbank (Calif.) to Jacksonville (Fla.) on the delivery flight of his line's new Lockheed Luxury Lodestar in 9 hours, 21 minutes, 39-1/2 seconds. His 2350-mile flight was made with a single refueling stop at Dallas, Texas. Howard Hughes, in a standard Lockheed 14 Transport, holds the former record with a 2478 mile flight to New York in 10 hours, 34 minutes two years ago. Calculations will be necessary before homologation of Baker's record. Baker is one of the few airline presidents holding a transport license.

Comes friction over the relative importance of commercial and military aircraft production in plants constructing both types. Douglas is now constructing nearly one hundred Model DC-3 and DC-4 airliners for the airlines and Lockheed about half that number, of their Lodestar design. That this work is not obstructing the flow of bombers is evident from production reports. However, the chief difficulty is in the access to engines. Royal Air Force is now footing the bill of changing the Douglas and Lockheed motors from Cyclone G-102's to G-200's. The former used engines will go into Hudsons and Bostons, the latter into commercial airliners when available.

A huge Douglas DC-3 Mainliner of U.A.L. crashed into a rocky slope and killed seven passengers and the crew of three. Cause of the crash was blamed on failure of the Salt Lake City "beam," near which the crash occurred, and as a result an additional alternate radio beacon range is being constructed to prevent a recurrence of the tragedy.

AWARDS: The famed Collier Trophy has been awarded to Dr. Walter Boothby and Dr. W. Randolph Lovelace of the Mayo Clinic and Captain Harry Armstrong of Wright Field for their research in stratosphere medicine in connection with high-altitude flying. Their findings: above 30,000 feet a pilot's blood actually boils!

The Clifford Burke Harmon Trophy to Jacqueline Cochran for the THIRD TIME! Presented by Mrs. Roosevelt, the award included mention of the flying cosmeticist's first blind-flying landing ever made by a woman flier and the setting of five national and two international rec-

ords during the year. Her plane: a special Seversky "Executive" de-militarized pursuit!

The Victoria Cross, first of the War, to Flight Lieutenant James Brindley Nicolson of the Royal Air Force for his action in downing two enemy Messerschmitt Me 110 twin-engined fighters while his own plane was ablaze and he himself wounded.

The Danel Guggenheim medal for outstanding contribution to aircraft design to Glenn L. Martin, founder and president of the huge Baltimore plant bearing his name.

INTERNATIONAL: Women pilots are now ferrying Hawker Hurricane fighters from plant to field. The twenty women have, until now, been flying only Miles Master training planes from plant to base but their experience proved them capable of handling the heavier, faster interceptors.

Major Helmut Wick, Germany's premier Air Ace, who has destroyed 56 Allied planes, was shot down into the English Channel by an unidentified R.A.F. pilot. Wick was Commander of the famed Richtofen Wing of the Luftwaft.

Air Chief Marshal Sir Hugh Dowding has been relieved of his fighter-command and will be sent to the U.S. for special (?) duty. Air Marshal W. S. Douglas replaces him and with this change comes a return of the fighter-command to the British Army. Thus does the Royal Air Force, the outstanding example of a unified air force, become a divisional corps as it now is in the U.S.A. The Fleet Air Arm is now a part of the navy.

Greece has sent out a world appeal to the free nations of the world for planes of every description. Her tiny air force, made up of only 146 airplanes, has been doing valiant offensive work and has recently been reinforced by a squadron of Hurricane and a squadron of Blenheim R.A.F. combat planes.

PERSONALITIES: Bernadine Lewis King, the "Flying Godiva" was in a wheel chair from her 44th forced landing but she will fly again as soon as possible. She earned her sobriquet when forced down while taking a sun bath a mile high au naturel!

Peter Lehman, 23-year-old son of New York's Governor, has won his wings by completing his flying course at New York University.

Lieut. Comm. Harry P. M. Connor, navigator for Howard Hughes' famed round-the-world flight in 1938, has been called to active duty as an instructor at the new Jacksonville Naval Air Station. He has been associated in experimental work at Hughes Aircraft Company, Burbank, California.

Arrigo Balboni, the "aircraft junk man" of Ontorio, California, has announced plans for an historic aviation museum on a 100-acre track to be completely enclosed. He has pieces of every famed aircraft from the Wright Brothers to Wiley Post-Will Rogers crash at Point Barrow, Alaska.

THE INDUSTRY: Plans for a transcontinental flight of the giant Curtiss-Wright Model 20, the largest twin-engine airliner built in this country, are well under way with test flights under Eddie Allen progressing. The huge ship has undergone extensive modifications including the substitution of a single rudder for the twin tail structure formerly mounted.

First of 36 DOUGLAS single-engine attack-bombers for the Norwegian Government in London has been delivered in Canada. The ships are powered by 1200 horsepower Wright Cyclone engines, mount seven machine-guns and bombs.

Present Douglas backlog stands at $141,287,127 and profits for the past year exceeded eight million dollars after all expenses were written off.

RYAN'S backlog stands at $11,400,000 and production on the new seaplane version of the popular ST military trainer ordered by Siam is progressing.

REPUBLIC will spend one million dollars to train 8,000 airplane mechanics. Men over 18 with or without experience will be taken and jobs offered them after completion of the course.

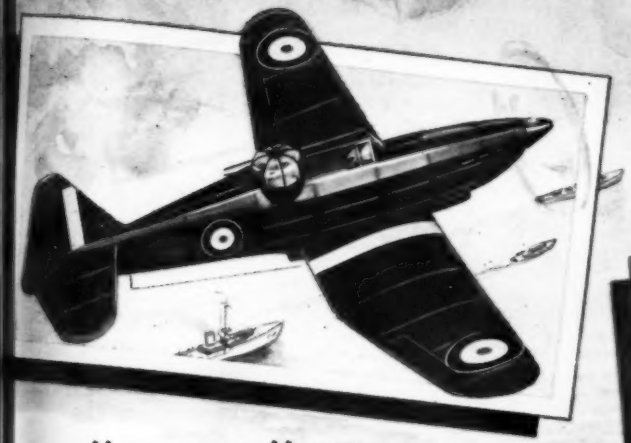
—AMERICA FIRST IN THE AIR—

[PRINTED IN U.S.A.]

COMET HERE THEY ARE!

The COMET WAR MODELS

you have been WAITING FOR!



The BRITISH "DEFIANT"

The originals of these ships are making history in Europe—and Comet's models of them are making history right here! Why? Because they're designed exactly to scale from data and photographs—and every one is a good flyer! The BOULTON PAUL "DEFIANT" is a 2-place British job with 4 machine guns mounted in a motor-driven turret. Fires broadside at enemy bombers. Kit No. E25—25" wingspan **25c**

The "STUKA" DIVE BOMBER

Comet war models contain new construction features to make them sturdier and easier to build. Kits have correct color insignia, and parts to make and install pilots. The JUNKERS "STUKA" is the now famous German dive bomber. Unique flap arrangement slows plane when diving. Carries 3 machine guns, four 110 lb. and one 1100 lb. bombs.
Kit No. E26—wingspan 25" **25c**

AUTHENTIC! REALISTIC! EASILY BUILT!

SUPERMARINE SPITFIRE

Single-seat day and night fighter, fastest and most maneuverable in the R.A.F. Highest speed is 367 M.P.H. Armed with 8 to 12 machine guns.
Kit No. A38—wingspan 16" **10c**

THE MESSERSCHMITT

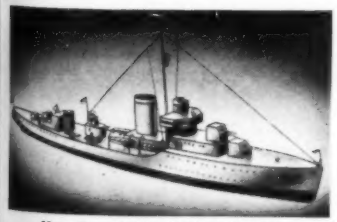
Single - seat German flyer. Accompanies bombers; used for light bombing. Top speed, 350 M.P.H. 4 machine guns in wing, cannon firing through propeller hub.
Kit No. A37—wingspan 16" **10c**

HAWKER HURRICANE

England's single place interceptor-fighter, rated as one of the finest in Europe. Climbs to 20,000 ft. in 9 minutes. Top speed 335 M.P.H. Has 8 guns, four in each wing.
Kit No. A36—wingspan 16" **10c**

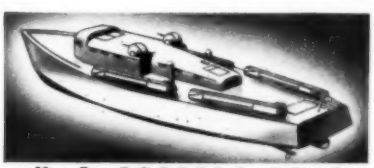
COMET'S FIGHTING SHIPS!

Boats that are in the news—and they're "big news" when offered by Comet!



U. S. DESTROYER

The trim, swift fighting craft, patrolling the seas for Uncle Sam. Swell model full of authentic details; easily built.
Kit No. K9—12" long **25c**
U. S. Cruiser. Kit No. K7—12" long **25c**



U. S. TORPEDO BOAT

Speedy demons—equipped with machine guns and torpedos, being built in great quantities for U. S. defense.
Kit No. K8—10" long **25c**

U. S. AIRCRAFT CARRIER

Uncle Sam wants many of these—and is building them! Comet quality at low price in this model. Kit No. D7—8" long **10c**
U. S. Submarine, Kit No. D8; Coast Guard Cutter, Kit No. D9—each 8" long—each...**10c**

Postage on any above models 15c—none if ordered from dealer.

COMET MODEL AIRPLANE & SUPPLY CO., 129 W. 29th St., Chicago, Dept. MN-2, 688 Broadway, N. Y.

PACIFIC COAST DISTRIBUTORS: Comet-Western Model Airplane Co., 4546 Hollywood Blvd., Hollywood, Cal.—1060 East 12th St., Oakland, Cal; Douglas Models Company, 105-109 East 2nd South St., Salt Lake City, Utah, Exclusive Utah Distributor; Exclusive Distributor, New York City Met. Area: Hobby Jobbers, 11 White St., New York City. Exclusive Distributor, Detroit Area: Airco Model Supply, 13329 Charlevoix Ave., Detroit, Mich. CANADA: Comet Canadian Model Aircraft, Exclusive Distributors, 635 St. Clair Ave., W., Toronto, Ont.

AMERICA'S NEW "OPEN" Champion!

MEGOW'S Ranger

MATHEW KANIA'S WINNER OF SIXTEEN CHAMPIONSHIP CUPS

GIANT FLYING SPITFIRE

50-in. wingspan flying models of the British fighting favorite. Complete kits $1.00. By mail, postage 15c extra.

GIANT FLYING STUKA BOMBERS

50-in. wingspan models of the German Junkers Dive Bomber JU 87B. Complete kits $1.00. By mail, postage 15c extra.

AVIATION is a fast-changing industry, and Megow model airplanes keep right in step. Every month Megow brings out something new, and model builders who watch Megow announcements and catalogs are in touch with the very latest developments.

In the gas model field, this month, Megow announces the RANGER, a sensational dual class model that has already garnered 16 big prizes for its designer! Primarily a Class B model, holding the National "Open" record, it can also be flown as a Class A with a smaller motor . . . the Megow "199." Span, 46 inches. Wing area, 325 square inches. Weight, ready to fly, 18½ ounces. Price only $1.50 at your dealer's. By mail, 20c extra for postage and packing.

Offering the most extensive line of hobbycraft kits, parts and supplies in the world today, the big new 132-page Megow catalog is a real handbook for every builder of model airplanes, ships and railroads. Send 10c for your copy today!